THE IRON TRADE REVIEW

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SLOW DELIVERIES

CAUSE CAUTIOUS BUYERS TO HESITATE,

But Specifications are Still Extremely Heavy.—Limited Supply of Steel-Making Pig Iron.—Cotton Ties Advanced.

As week after week and month after month conditions of unprecedented prosperity continue, there is a gradually increasing tendency to speculate as to when a change toward lower prices and decreased demand will come, but at the present time only the most pessimistic can see any unfavorable signs. It is true that in some lines new business is not quite so active, but when buyers cannot receive promises of deliveries in less than four to six months on many products without paying heavy premiums, they are naturally cautious in regard to adding to their obligations, and many are willing to wait before placing orders which cannot be filled prior to next fall. This hesitancy cannot, however, be regarded as evidence of an approaching period of depression.

Pig Iron Is Active. The buying of steel-making pig iron has continued in the central west, sales of Bessemer in the Pittsburg district amounting to about 28,500 tons, and it is evident that the supply of Bessemer in the valleys for the remainder of the year is not appreciably greater than the pending inquiry. In foundry grades the market has been active in nearly all centers, and prices are firm. Inquiries for malleable are numerous. Middlesboro No. 3 has advanced to 57 shillings on account of the strong demand from Germany and the United States. Four cargoes aggregating 20,000 tons of English iron have been chartered for delivery at Philadelphia in May. Foreign iron is now about the only means of relief in the spot iron market for many buyers.

Coke Shows Weakness. The coke market continues weak, but this condition is generally attributed to the fact that a number of blast furnaces have been compelled to blow out for repairs and there is a firm undertone. While low prices are named for spot shipment, producers are not willing to contract for future delivery at the same quotations, as they confidently expect conditions to improve at a not far distant date.

Cotton Ties Advanced. The Carnegie Steel Co. has opened the cotton tie market at an advance of 10 cents per bundle over last year's price of 85 cents. Large shipments have been made to distributing centers in the south, and the demand is expected to be heavy. The announcement of the Steel Corporation that it was willing to receive orders for steel rails for 1908 delivery was followed by similar announcements by other interests.

Structural Material. The condition of mills rolling structural shapes has shown marked improvement during the past two months, as they are now crowded with specifications and the prospects are most encouraging. A number of good sized orders have recently been received from San Francisco and other Pacific coast cities. The demand of structural workers at Chicago for an advance to $5 per day in wages is causing some anxiety. Heavy premiums are being paid, amounting in a few instances to as much as $8 per ton for prompt delivery of plates. The Illinois Steel Co.'s capacity on plates for this year is covered by orders on hand. The inquiry of the Steel Corporation for 6,000 freight cars is one of the indications of continued heavy demand for plates. Similar conditions prevail in regard to sheets.

Iron and Steel Bars. The bar iron market is weak in the central west, with prices showing considerable irregularity. As a rule, however, mills are well supplied with orders for from 60 to 90 days. Many inquiries for cast iron pipe are pending and the outlook for business is excellent.

Opening of Navigation. Owing to the continued cold weather, the opening of navigation on the great lakes proceeds very slowly. Ice crushers are at work, but it is not expected that any considerable tonnage of iron ore will be delivered at Lake Erie ports prior to May 1. The movement of ore from docks to furnaces is proceeding rapidly and the amount of ore on docks May 1 will be unusually small.

PENNSY'S RAIL REQUIREMENTS.

New York, April 24.—The New Orleans and Northeastern has taken 4,500 tons of rails for 1907 delivery and scattered sales aggregate 3,000 tons. The Pennsylvania railway requirements, placed at 153,000 tons, have not yet reached the sales departments. This tonnage is larger than the original purchase of this road a year ago.

Sales of 20,000 tons of pig iron in last two days reported.

Will Build New Stack.—Corrigan, McKinney & Co., Cleveland, have decided to build a new furnace at the plant of their subsidiary concern, the Josephine Furnace Co., at Josephine, Pa. The new stack will be an exact duplicate of the present one.

Looking for a Site.—Second Vice President W. B. Dickson and a committee from the United States Steel Corporation are in Duluth considering a site for the new plant. It is authoritatively stated that the Zenith property will not be taken. Three large tracts of land are under consideration. The plant will be operated as a separate unit.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Heavy Sales of Bessemer.—Limited Supply of Steel-Making Irons.

Office of THE IRON TRADE REVIEW.
521 Park Bldg., April 24.

The closest attention is now being centered upon the supply of steel making iron for last half deliveries and with but less than one month of the second quarter over, the tightness of the situation is apparent to all and not a little anxiety is being expressed as to the result. The Bessemer Association is practically sold up until Jan. 1 and from this time until the close of the year will not be much of a factor, having been compelled to practically borrow pig iron to make up the tonnage of its last big sale.

W. P. Snyder & Co., still has some iron left, but the inquiries now in the market for last half deliveries would clean this up if the full extent of each inquiry should be accepted and placed on the books as a contract. Prices have advanced $1 per ton on Bessemer since the Bessemer Association made its sale to the Youngstown Sheet & Tube Co. There are several detached furnaces that have not sold up, but their combined tonnage for the last half of the year would not afford any material relief in case of a pinch. The extent of Bessemer pig iron sales may be judged from the fact that the estimated output of at least two new furnaces that will not be in blast until sometime between July and September has been sold.

Pittsburg has had its big buying movement in steel making iron and the Chicago district is well through it, but the east, which is usually ten days or two weeks behind in these periodical buying movements, has not done anything on a large scale and this is to be expected very soon.

In finished lines the situation is drawing very tight and deliveries on the staple lines short of three months are the exception much more frequently than the rule and on the heavy leaders, steel bars, plates, sheet products, pipe and wire products, delivery promises are getting worse each week, with new business continuing in a steady but not large volume. Specifications against contracts are very heavy and pressing, and in many instances specifications are in the hands of the manufacturers for the full contract tonnages and extending through the entire contract period.

An interesting feature of this week's market was the placing of several small tonnages by agricultural implement makers for steel bars at the full card prices, this being an indication that this particular trade has given up hope of securing its customary concession of $1 or $2 per ton. One of these contracts specifically provided that no specifications should be made against it prior to July 1.

The Carnegie Steel Co., on Thursday of this week opened the cotton tie market at an advance of ten cents per bundle over last year's price of 85 cents per bundle. Practically all the cotton ties are now at distributing centers in the south. The sale of 46,000 tons of open-hearth standard rails by the Tennessee Coal, Iron & R. R. Co., was immediately followed by the opening of books for 1908 by the Carnegie Steel Co., and other corporation interests and by the Cambria Steel Co.

The Pittsburg Steel Co., has closed a contract with Riter-Conley Construction Co., for the construction of a new open-hearth building at its Monnessen, Pa., plant.

Pig Iron.—The available supply of last half steel-making iron is small, much smaller than most buyers believe, and it is closely held by very few interests. The sales during the week under review, on Bessemer pig iron alone aggregate 28,500 tons, and all of this, with the exception of 500 tons of chilled Bessemer for prompt delivery, which was sold at $23, was at $22 valley furnace in lots as follows: 6,000, 10,000, 6,000, 1,000, 5,000, all for last half delivery. The active inquiry now in the market is about 40,000 tons, and the available unsold supply for the last six months, after a careful estimate of valley furnace outputs not already disposed of, would not greatly exceed these figures. Basic pig iron, while it is not as closely sold as Bessemer, is scarce.

While a large number of the consumers of foundry iron have covered for their requirements, it is not moving as rapidly as steel making irons, and many foundrymen are in a quandary as to what course to pursue. Most of the low priced contracts made last summer have expired and the question the melters are debating is whether to get under cover now or take their chances under future conditions. For the remainder of the second quarter, which is to all intents prompt shipment, northern No. 2 foundry is quoted $24.50 to $25 valley nominal, although as high as $25.50 has been paid. For third quarter and last half $22 is quoted as a fair average, although some furnace interests are already quoting $23. Southern No. 2 foundry is quoted $18.50 to $19, Birmingham, for last half. Northern gray forge iron is quoted $21 to $21.50, valley, for third quarter and last half. Several foundry furnace interests are refusing to quote on third quarter alone, insisting upon contracts running through the remainder of the year. On third quarter deliveries we quote as follows:

Bessemer, Valley	$ 22.00
Bessemer, Pittsburg	23.35
No. 1 Foundry, Pittsburg	23.35 to 23.85
No. 2 Foundry, Pittsburg	22.85 to 23.35
Gray Forge, Pittsburg	22.35 to 22.85
Basic, Valley	22.00
Basic, Pittsburg	22.85

Ferro - Manganese.—The Republic Iron & Steel Co., during the past week bought 500 tons of foreign 80 per cent ferro-manganese for mid-summer delivery at a price under $67 delivered Pittsburg, this being the first large sale indicative of the market in this district for some time past. Russian furnaces are selling their product at a lower figure than the English furnaces. For prompt shipment we quote $70 to $72 Pittsburg on foreign 80 per cent ferro-manganese, and for last half deliveries $66 to $68.

Imported 50 per cent ferro-silicon is quoted $110 Pittsburg; domestic 12 per cent, $36; 11 per cent, $35; 10 per cent, $34; with the lower grades imported ferri-silicon, $1 higher.

Steel.—The market on Bessemer and open-hearth billets, sheet and tin bars is purely nominal as far as new business is concerned and the leading producers heretofore selling in the open market, on account of the extremely heavy demand of their own finishing mills are inclined to greatly reduce the number of their contracts in order to have a larger supply of semi-finished material for their own use. One of the important independent interests in the Pittsburg district has been compelled to shut down one or two of its finishing mills a day or two a week on account of an inadequate supply of steel. Bessemer billets are quoted nominally $30 to $31, maker's mill, and sheet bars at about the same figure, although monthly adjustment contracts have made the price higher to some buyers. Open-hearth billets are nominally $31.50 to $32.

Wire and Wire Nails.—The filled-up condition of mills for the full contract

period and the congestion due to heavy specifications by both jobbers and consumers has rendered any quotation on new business purely nominal and we quote the following official card:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads, $2.20; and less than carload, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers, and $1.90 by carload.

Merchant Bars.—The feature of the week as far as steel bars are concerned has been the placing of several small tonnages by manufacturers of agricultural implements at the full card price 1.60c base Pittsburg with no drawback and the understanding that there shall be no specifications before July 1. These transactions are taken as an indication of the direction in which the wind is blowing as far as concessions to this particular interest is concerned. A fair volume of business in steel bars for future delivery covering the last half of this year and first quarter of next year and one contract of 12,000 tons from April to April are announced. Bar iron in this district is considerably weaker in tone and one of the smaller interests is quoting 1.70c base Pittsburg for shipment into this district, a decline of $2 a ton under previous prices. The larger interests, however, are still quoting 1.80c base Pittsburg for delivery into this district and 1.65c base Pittsburg plus freight to point of shipment for western deliveries, although this price has been shaded. We quote as follows:

Common iron bars, 1.80c Pittsburg in carload lots and over; 1.85c in less than carloads; Bessemer steel bars, 1.60c, net; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 5 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Muck Bar.—There have been several small sized inquiries for muck bar of special sizes, but there is very little being offered and the market is nominal at $37.50 to $38, Pittsburg, on all pig metal bar and $36.75 on part scrap bar.

Sheets.—Premium prices are being secured in many instances where manufacturers are in shape to make shipments in from four to six weeks, and one case is noted where $7 per ton premium was paid on No. 11 light plate for four weeks' delivery. There are very few mills in position to take on this premium business without postponing shipments on regular orders, but considerable of this has been done. Two months is now a good delivery promise, but most of the manufacturers cannot do better than two to three and the leading interest is nearer five to six months. Notwithstanding these conditions, a fair volume of new business is being received, practically all of it unsolicited, and specifications are very heavy, many contracts being specified completely throughout their period. Prices are unchanged as follows:

Black steel sheets one pass, cold rolled, Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15c; Nos. 25-26, 3.35c; No. 27, 3.55c; No. 28, 3.75c; No. 29, 4.00c; No. 30, 4.25c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½-inch corrugation, and $3.25 per square No. 28.

Plates.—There has been considerable inquiry for additional plate tonnage for municipal pipe lines and Montreal and Philadelphia are among the largest. The announcement that the United States Steel Corporation has inquiries out for 6,000 steel freight cars indicates a further set back of mills than now exists. Eastern mills charging premium prices are filled up for a period further ahead than is their custom to book. Prices are unchanged as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c; extras on the regular plate schedule are as follows per 100 pounds: Boiler and flange steel plates, 0.10c. A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrower and not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plate on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Tin Plate.—Practically all the large consumers of tin plate are covered through the third quarter, but a considerable new tonnage is being received from jobbers. We continue to quote as follows:

Coke tin plate 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in ten days.

Hoops, Bands and Cotton Ties.—The Carnegie Steel Co. announces the opening of the cotton tie market for April 25, with a price at 95 cents per bundle, an increase of ten cents per bundle over the schedule price of last year. Investigation of the cotton plant in the south this year indicates an increase of 20 per cent. Practically all the cotton ties are now in storage at southern distributing centers. On hoops and bands, the business has been running along evenly with practically no change, specifications being about equal to mill shipments and the new tonnage, while it has been fair for this time of the year, is comparatively light and the bulk of new yearly tonnage contracts is not expected before July 1. We quote as follows:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c; base half extras as per standard steel.

Rails and Track Material.—The announcement of the Steel Corporation that it had opened its books for 1908 rails came as a surprise at this early date. The official announcement came on April 16, but as far as can be learned no business has been taken on by local mills. The Cambria Steel Co. has also opened its books for 1908 at the price which prevailed for the past few years, $28 on sections 50 pounds and heavier, 500-ton lots and over. The Cambria company, when it opened its books for next year, announced it had practically no capacity for 1907 business. Contracts for standard sections during the past week have been very light; in fact, much lighter than was expected after the inquiry of last week. On light sections, demand is good and specifications are coming in very freely.

Prices are unchanged and we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 50 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; spikes for forward deliveries, $2.50.

Merchant Pipe.—The leading interest is taking on its normal average new tonnages, but not at a fixed price, this business being accepted under conditions announced a month ago, that any contract from jobbers would be at a price to be fixed prior to June 1. Youngstown Sheet & Tube, La-Belle, and Marks on steel pipe, and Byers on iron pipe will take on nothing prior to about July 1. On merchant pipe we quote the following nominal discounts on base sizes, consumers carload lots:

	—Steel— black.	galv.
⅛ to ¼ inch	65	49
⅜ inch	67	53
½ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	68	53
EXTRA STRONG PLAIN ENDS.		
⅛ to ¾ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
Double extra strong plain ends, ⅛ to 8 inches	54	43

Boiler Tubes.—There has been no change, either in conditions or prices, the demand continuing extremely heavy, and we quote the following nominal discounts:

	Iron.	Steel.
1 to 1¼ in.	41	47
1¾ to 2¼ in.	42	59
2½ in.	47	61
2¾ to 5 in.	52	65
6 to 13 in.	42	59

Structural Material.—An increase in demand for structural material is noted by the mills. The contract for the erection of a new open-hearth building for the Pittsburg Steel Co.'s plant at Monessen, Pa., was secured by the Riter-Conley Construction Co., of Pittsburg. The Granger Co., Louisville, Ky., was the lowest bidder on the 3,300-ton viaduct for Hamilton avenue, Cincinnati. Mill prices are unchanged and we quote:

Beams and channels, 15-inch, and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.70c base.

Coke.—The supply of spot coke is not so great as it was a week or ten days ago, and rather than sell at the present market many plants in the region are operating but four or five days a week in order to reduce the production. Producers at the present time are not anxious to quote on last half coke, either furnace or foundry grades. The feeling is strong in regard to last half furnace coke, but the same cannot be said of foundry coke. On foundry coke, standard Connellsville, for spot shipment we quote $3.30 to $3.40, and on furnace coke for spot shipment $2.50 to $2.60 at the ovens.

Old Material.—Despite the extreme strength shown in the pig iron market, scrap prices have not improved, and there is not much inquiry and very little old material is being offered by producers, so that in consequence there is but little action among dealers. For delivery in the Pittsburg district we quote:

Heavy melting scrap, $18 to $18.25; re-rolling rails, $19 to $19.50; bundled sheet scrap, $16.50 to $16.75; iron axles, $30.50 to $31; old iron rails, $23 to $23.50; No. 1 wrought scrap, $19 to $19.25; old car wheels, $24.50 to $25; low phosphorus scrap, $22.50 to $23; machine shop turnings, $15.50 to $16; axle turnings, $16.50 to $17; cast borings, $13.25 to $13.75; No. 1 cast scrap, $20.50 to $21.

CHICAGO.

Varied Views as to the Future—Extremely Heavy Specifying Continues.

Office of THE IRON TRADE REVIEW,
1362 Monadnock Blk., April 23.

Despite all the evidences that exist of abnormal conditions in iron and steel, and they are very real, the market continues a very nervous one. This is the period of annual uncertainty and much speculation is indulged in as to the course the future will take. Prophets are plentiful who predict that the remaining months of the year will witness the highest prices and greatest activity in iron and steel in a decade, while others are just as confident that a turn in the tide is imminent and that considerably lower prices will prevail before the ushering in of 1908. Whichever course the market may take, this sparring for position has not been conducive to a noticeable increase in the volume of new business, though it has developed an active inquiry. There is no lagging of specifications, however, and mills continue crowded to their utmost capacity on all lines. So slow have deliveries been coming forward, that an advance in sheets, ranging from $2 to $5 a ton has been made by local jobbers, while an advance in plates from stock is daily expected. Jobbers of merchant pipe and boiler tubes have been heavily crowded since the withdrawal from the market of the leading producer, and while local discounts on shipments from stock rest at 72 off the list for pipe and 60 off for steel, any day may bring forth an advance. Cast iron pipe continues in active demand, transactions aggregating 12,000 tons being under negotiation. Implement interests are slow in covering for their bar requirements for the ensuing year, though eager to place orders for nearby deliveries and to secure shipments against old contracts. Specifications from railroads and car builders are undiminished. The American Car & Foundry Co. is said to be sold up tight for the entire year, orders for 80,000 cars being reported on its books, against an annual capacity of 100,000. The movement in structural steel has experienced a slight recession due to the threat of a strike May 1 among the structural iron workers.

Pig Iron.—It is a drifting market in pig iron. Confidence is not widespread that current quotations are permanent, and while inquiry is free and plentiful, foundrymen are slow to cover for the last half. From a statistical standpoint, the market appears impregnable, the only drawback to an ideal condition being the lack of sentiment necessary to crystalize a nervous indifference into a confident optimism. Furnaces north and south are fully two months behind in their deliveries, and with many stacks idle for relining and others anticipating an early suspension for the same cause, it is extremely improbable that the delinquency will be overtaken before the commencement of fall. Buying in the week under review has been largely for spot and nearby deliveries, for which northern makers continue to ask on the basis of $22.50 Birmingham, for April and May shipment, and $21.50 to $22 for June. Northern furnaces quote a wider range of prices for these deliveries, the minimum being $26.50 Chicago, for No. 2 foundry. Foreign iron for spot shipment is offered at $28 to $28.50 Chicago. Prices for the second half have perceptibly strengthened on the basis of $24 to $24.50 Chicago, for northern No. 2 foundry or malleable Bessemer, and $18.50 to $19 Birmingham, for southern No. 2. The inquiry for malleable iron is especially active, some calling for deliveries running into 1908. The largest sale of the week involved 1,000 tons of northern No. 2 for second quarter shipment which was closed at $26.50 Chicago, and 2,000 tons of southern irons for the last half, which was taken on the basis of $18.50 Birmingham, for No. 2. Charcoal iron is very strong at $27.50 for spot, and $26.50 for second half delivery. Our quotations are as follows:

Lake Superior charcoal	$ 26.50
Northern Foundry No. 1	24.50 to 25.00
Northern Foundry No. 2	24.00 to 24.50
Northern Foundry No. 3	23.50 to 24.00
Northern Scotch Foundry	24.50 to 25.00
Ohio Strong Softeners No. 1	23.80 to 24.30
Ohio Strong Softeners No. 2	23.30 to 23.80
Southern Foundry No. 1	23.35 to 23.85
Southern Foundry No. 2	22.85 to 23.35
Southern Foundry No. 3	22.35 to 22.85
Southern Foundry No. 4	21.85 to 22.35

Southern No. 1 Soft	23.35 to 23.85
Southern No. 2 Soft	22.85 to 23.35
Southern Gray Forge	21.35 to 21.85
Southern Mottled	20.85 to 21.35
Southern Silveries, 4 per cent to 6 per cent Silicon	23.85 to 24.85
Jackson Co. Silveries, 8 to 10 per cent Silicon	30.30 to 32.30
Malleable Bessemer	24.00 to 24.50

Billets and Rods.—Local sales are restricted largely to carload lots of forging billets, for which producers have no difficulty in securing $38 Chicago. One transaction this week of 50 tons was closed on this figure. Wire rods are very scarce, and current quotations, ranging from $37 to $40, Pittsburg, are of a nominal character.

Iron and Steel Bars.—Further contracts for season's requirements in steel bars are reported from implement interests. The movement from this source is, however, very slow, many consumers still hoping that events may yet justify a concession for their annual business. Bar iron is fairly active, specifications continuing to full contract quotas. On new tonnage, the market is firm at 1.65c Pittsburg for carload lots, and 1.60c for larger quantities. Other prices are as follows:

Soft steel bars and bands, 1.76½c, half extras; soft steel angles, less than 3 x 3, 1.86½c; hoops, 2.16½c base, full extras. We quote bar iron from stock 2.25c, full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by ⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2, half extras; soft steel hoops, 2.40c to 2.50c full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—Except that the Illinois Steel Co. is filled up for the entire year on this product, no change is noted. There is a sharp demand on independent mills and jobbers, and the former have no difficulty in obtaining from 1.80c to 1.90c Pittsburg for quick deliveries. Jobbers are experiencing trouble in maintaining their stocks and another advance in prices is contemplated. We quote as follows:

Plates ¼ inch and thicker 6⅛ to 100 inches wide, either universal or sheared, 1.70c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago, 16½c per 100 pounds. Jobbers' prices for shipment from local stocks are as follows: Tank steel ¼ inch and heavier up to 72 inches wide, 2.20c; 3-16 inch up to and including 60 inches wide, 2.30c; 3-16 inch 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.35c. Flange steel, 25c extra; heads, 25c extra.

Sheets.—An advance ranging from $4 to $5 a ton on blue annealed sheets, and from $2 to $3 a ton on box annealed sheets, has been made effective on lots from warehouse stocks. The rapid depletion of these stocks and the difficulty experienced in replenishing same has made this step a necessity. The leading interest is slow in overtaking its delinquent tonnage, and neither black nor galvanized sheets can be had from this producer inside of 20 to 24 weeks. Price, therefore, has ceased to be an object, if the material can be shipped promptly. We have revised our prices, and quote as follows:

Black sheets Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28, 2.60c Pittsburg. Galvanized sheets, No. 28, 3.75c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on carload lots or less from store are as follows: No. 10, 2.50c to 2.55c; No. 12, 2.55c to 2.60c; No. 14, 2.60c to 2.65c; No. 16, 2.65c to 2.70c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27, 2.95c to 3.05c; No. 28, 3.05c to 3.15c; No. 30, 3.35c to 3.45c. Galvanized sheets, No. 10 to 20, 3.50c to 3.55c; Nos. 22 and 24, 3.65c to 3.75c; No. 26, 3.85c to 3.90c; No. 27, 4.05c to 4.15c; No. 28, 4.25c to 4.35c; No. 30, 5.40c to 5.45c.

Structural Steel.—New tonnage and specifications on local mills continues heavy. A large amount of building is in progress or pending in the west, and at the present rate of consumption makers will soon be filled for a considerable period ahead. Figures have been submitted on the new Merchants' National Bank building, at Indianapolis, the steel requirements of which amount to 3,500 tons. It develops that plans are being made for a third railroad depot to be erected in Chicago at an early date. This is being undertaken by the Western Indiana railroad, the capital stock of which is owned by several trunk lines. The new depot will be erected on the site of the present station at Polk and Dearborn streets, and it is said will cost between $20,000,000 and $25,000,000. Prices are without change as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from stores are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base, beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rails and Track Supplies.—Bookings of standard sections for 1907 delivery are limited by the unsold capacity of mills. Traction rails are the most active, the largest order this week being for 1,000 tons. No change is noted in the conditions surrounding the production of light rails and track supplies. We quote as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $35; 25-pound, $36; 20-pound, $37; 16-pound, $38; 12-pound, $39, and lighter sections down to 8-pound, $45.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. On orders accompanying rail contracts for future delivery, we quote angle bars, 1.65c; spikes, 2.35c; bolts with square nuts, 2.65c; with hexagon nuts, 2.80c. For carload lots or less, for prompt shipment, the following prices are asked: Angle bars, 2.25c to 2.75c; spikes, 2.60c to 2.70c; bolts with square nuts, 2.85c; with hexagon nuts, 3c.

Merchant Steel.—Contracting for July to July requirements continues light. Specifications on old contracts are coming in freely, and mills are making some headway against the delinquent tonnage. We quote as follows:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c base; iron finish, 1½ x ½ inch and larger, 1.76½c base; channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger, 2.16½c; smooth finished machinery steel, 2.16½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring, 1.96½c; crucible tool steel, 6½c to 8c, with higher prices asked on special grades. Shafting is very strong. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots in base territory.

Cast Iron Pipe.—A large amount of pipe is under negotiation. The principal jobs pending are St. Louis, 6,000 tons; Cincinnati, 2,500 tons; Denver Gas Co., 800 to 1,000 tons, and the Edison Co. of Los Angeles, 2,500 tons. The Portland, Ore., inquiry for 2,600 tons was let to the local pipe plant there. Prices are very firm, but without change. We quote four-inch water pipe, $38.60; six to 12-inch, inclusive, $37.60; 16-inch and upward, $36.60; gas pipe, $1 a ton higher.

Merchant Pipe and Boiler Tubes.—New tonnage for forward shipments is accepted by local sellers subject to prices and deliveries to be determined later. For quick shipment, jobbers' stocks are

the only source of relief. These are none too ample, and prices remain strong at 70 off for black steel pipe, ¾ to 6 inch, and iron pipe at four to five points higher. Tubes are unchanged at 60 off for steel, and 47½ for iron and seamless. The following quotations are those of an independent producer, but are admittedly only nominal. Every transaction is handled on its individual merits and quoted accordingly.

Random lengths with thread couplings, ⅛ and ¼ inch, 65 per cent discount off for black and 49 per cent off for galvanized; ¾ inch to 6 inches, 73 per cent off for black and 63 per cent off for galvanized; 7 to 12 inches are quoted at 68 and 53, respectively. Extra strong plain ends are held at 58 off for black and 46 off for galvanized, in sizes from ⅛ to ⅜ inches, and at 6 and 49 respectively for 4½ to 8 inches.

Wire Products.—At the expense of tiresome reiteration, we have to report only that mills are crowded with specifications and bending every effort to overtake their delinquent tonnage. Consumption in the northwest has increased rapidly since the first of the month and stocks in that district are continually low. Prices are without change as follows:

Wire nails, $2.15; painted barb wire, $2.30; galvanized barbed wire, $2.60; smooth annealed wire, $2.30; polished staples, $2.55. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—No particular change has occurred in the week under review. The western trade is actively solicited for contracts covering requirements over the balance of the year, and these are coming in at a satisfactory rate. Connellsville foundry coke is now held at $3.35 to $3.40 ovens for last half deliveries, and at $6.50 Chicago for Solvay coke.

Old Material.—The local market is quiet and inclined to weakness. The principal demand has been for mill scrap, of which a few thousand tons have changed hands. Cast scrap continues weak as a result of the increased shipments of pig iron from southern furnaces. Railroads are offering material in plentiful amounts, and the frequent appearance of large tonnages of No. 1 railroad wrought and cast scrap has had a tendency to keep down prices. That a number of local dealers are short large amounts of all kinds of scrap is evidenced by the rapid and easy absorption of every list placed upon the market. The Illinois Central list of 3,720 tons, issued a week ago, has been sold. The C. B. & Q. list of 4,500 tons is the only one now pending. We have revised our prices, and quote as follows, gross tons in the first paragraph:

Old Steel Rails (less than 3 feet)	$17.50 to 18.00
Old Car Wheels	25.00 to 25.25
Old Iron Rails	24.50 to 25.00
Rerolling Rails (3 feet and over)	18.50 to 19.00
Light Section Relayers, 45 lbs. and under, subject to inspection	30.00 to 32.00
Relaying Rails, subject to inspection	31.00 to 31.50
Frogs, Switches and Guards	16.50 to 17.00
Heavy Melting Steel	15.50 to 16.00
Mixed Country Steel	12.50 to 13.00

We quote net tons as follows:

No. 1 R. R. Wrought	$15.25 to 15.50
No. 2 R. R. Wrought	14.25 to 14.50
Shafting	17.00 to 17.50
Dealers Forge No. 1	12.50 to 13.00
Wrought Pipe and Flues	12.50 to12.75
No. 1 Cast, 150 lbs. and less	18.50 to 19.00
No. 1 Mill	10.00 to 10.50
Mixed Busheling (No. 1 & No. 2)	11.00 to 11.50
Country Sheet	8.50 to 9.00
No. 1 Boilers Cut	11.50 to 12.00
Boiler Punchings	15.00 to 15.50
Cast Borings	9.75 to 10.00
Mixed Borings, etc	9.75 to 10.00
Machine Shop Turnings	11.50 to 12.00
Railroad Malleable	16.50 to 17.00
Agricultural Malleable	15.50 to 16.00
Stove Plate and Light Cast Scrap	15.00 to 15.50
Old Iron Splice Bars	19.50 to 20.00

The Lackawanna Steel Co. has transferred its Chicago office from the Merchants' Loan & Trust building to suite 1726-1728 Commercial National Bank building. The United States Steel Corporation will also move its offices into that building this week.

CLEVELAND.

Price of Merchant Steel Pipe Advanced.—Coke is Weak.—Pig Iron Firm.

Office of THE IRON TRADE REVIEW,
Browning Building, April 23.

Iron Ore.—Owing to the continued cold weather, navigation has not yet opened at the Soo, and probably will not be for a day or two. Ice crushers will open a channel from Detour to the Soo. About 60 vessels are detained at Detour, and as soon as the locks are opened there will be a grand rush for the head of the lakes. Nearly all the vessels are carrying coal and will unload it as soon as possible and return with ore. It is probable that there will be much delay in unloading the vessels, and it is not expected that any large amount of ore will be received at lower lake ports before May 1. The first iron ore cargo of the season to be received at South Chicago was delivered Monday, April 22, by the steamer James S. Dunham, which carried 8,000 tons from Escanaba consigned to the Illinois Steel Co. The movement of ore from docks to furnaces is heavy, and it is expected that the amount of ore on docks May 1 will be unusually small. The wages of mates have been raised voluntarily by members of the Lake Carriers' Association.

Pig Iron.—A number of sales of foundry iron aggregating some 20,000 tons for last half delivery were made during the last three days of last week, and while the actual transactions have not been heavy this week, inquiry for both steel making and foundry irons has been strong, and the market is very firm without change in quotations. Some spot basic has been sold at $23.50 valley, and it is difficult to obtain spot foundry iron at any price, the nominal quotation being $25. Some foreign iron is coming into the market at $24.50, delivered Cleveland. Furnace men are very firm in their views and confident of a continuation of favorable conditions. Nearly all in the valleys are sold up until about Oct. 1, on foundry grades and are confident of being able to sell such iron as they may have for the last quarter. We quote f. o. b. Cleveland for last half delivery as follows:

Bessemer	$ 21.90
No. 1 Foundry	23.00
No. 2 Foundry	22.50
No. 3 Foundry	22.00
No. 2 Southern	22.85
Gray Forge	21.00

Coke.—The coke market is unmistakably weak, and it is difficult to quote for spot delivery as ovens are disposing of their product at such prices as can be obtained, each transaction being a law unto itself. There is, however, a strong feeling that this condition is temporary, being due to a number of furnaces going out of blast for repairs, and sellers are not anxious to contract for future delivery at much lower than recent quotations. For such delivery we quote furnace coke $2.65 at the ovens, and foundry $3.35.

Finished Material.—Owing to the fact that it is impossible to give deliveries on most finished products short of four or five months, making it very difficult for manufacturers to estimate future requirements, new business is not being received in as large volume by the mills as it was some time ago, but specifications are just as heavy, and jobbers are taking more orders from stock than ever before in their experience. A slight slackening in new business is not regarded as at all unfavorable, but simply as the inevitable result of the tremendous demand which has piled up orders to such an extent that deliveries can not be made for many months. Cautious buyers naturally hesitate before contracting so far in advance. If there is any weakness in the present market, it is in bar iron, in which prices are irregular, but mills are not worrying, as they have orders in advance to keep them busy from 60 to 90 days. The Youngstown Sheet & Tube Co. has issued a new card advancing its price for merchant steel pipe one point in the base throughout. Based on the new card, the lowest price to the jobbing trade for carload lots will be 73 and 5 Pittsburg base for ¼ to 6 inch black

effective at once. The company says:

"This card is issued as a matter of information only, and must not be construed as a general quotation or solicitation of business on our part as we are not in position to take on new business at this time, except for such special sizes and kinds as we may happen to have on hand in excess of orders."

Old Material.—The market is lower and weaker, and bearish sentiment continues strong. A number of changes are noted in the market this week, but all are toward lower levels. All grades of cast scrap present the strongest feature of the market. The Erie railroad is offering a small lot and heavy lists from various railroads are expected in the ensuing week. We have revised our quotations and quote f. o. b. Cleveland, as follows:

Old iron rails	$24.00 to 25.00
Old steel rails (re-rolling)	17.50 to 18.50
Old steel rails (under 6 feet)	18.50 to 19.50
Old car wheels	23.00 to 23.50
Steel boiler plate	14.00 to 14.50
Steel axles	21.50 to 22.50
Malleable iron (railroad)	18.50 to 19.00
Malleable iron (agricultural)	16.50 to 17.00
Heavy steel	16.00 to 16.50
Country mixed steel	14.50 to 15.50
Low phosphorus	21.50 to 22.50

We quote net tons as follows:

No. 1 R. R. wrought	$16.00 to 17.00
No. 1 busheling	13.50 to 14.00
No. 1 machine cast	17.00 to 18.00
Iron axles	25.50 to 26.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.75 to 13.25
Grate bars	14.00 to 15.00
Pipes and flues	13.50 to 14.00
Tank iron	12.00 to 13.00
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.50
Wrought drillings	12.75 to 13.25
Stove plate	14.00 to 15.00
Cast borings	10.75 to 11.25

CINCINNATI

Fair Tonnage Sold.—Spot Is Quiet.—Some Coke Contracts.

April 23.

Pig Iron.—Spot iron rules quiet, as deliveries continue good, thus reducing the necessity for buying spot at the premiums now prevailing. There is not much offered, however, and when arrivals are not easily placed, the iron is shipped on some contract, thereby preventing an over supply. Prompt shipment iron is obtainable at $22.00 to $22.50 Birmingham for No. 2 and this week there is a dollar per ton discount for No. 3 with No. 4 and gray forge on an independent basis. We quote for prompt delivery delivered Cincinnati as follows:

Southern foundry No. 1	$25.75 to 26.25
Southern foundry No. 2	25.25 to 25.75
Southern foundry No. 3	24.25 to 24.75
Southern foundry No. 4	21.25 to 21.75
Southern No. 1 soft	25.75 to 26.25
Southern No. 2 soft	25.25 to 25.75
Southern gray forge	20.75 to 21.75
Northern No. 1 foundry	26.65 to 27.75
Northern No. 2 foundry	26.15 to 27.15
Northern No. 3 foundry	25.65 to 26.65

For second quarter delivery quotations are mainly $21.50 Birmingham for No. 2 foundry, with the differences between the grades irregular, depending on the disposition of the furnace or the condition of its order book as to the lower grades.

For the last half $18.50 Birmingham is minimum, with an increased number of furnaces holding for $19.00, and some claiming to be sold up for the third quarter and only quoting for the last quarter. Northern iron is firm at $21.50 for the last half, with practically nothing offered in the Ironton district for delivery before the last quarter.

There has been a good scattering inquiry during the week and a fair tonnage booked. An Ohio melter bought about 1,000 tons of malleable, mainly on the basis of $21.50 at northern furnance for last quarter delivery. There is an inquiry for from 1,000 to 1,600 tons of northern iron third quarter delivery, another for about 8,000 tons of basic, both from Ohio melters. In St. Louis territory there is an inquiry for 5,000 tons of basic for last quarter delivery. The general feeling in the market is strong.

There is much confidence in the future of prices for the third quarter. It has developed that foreign iron has, in some cases, been placed on contracts for southern iron, in order that sellers may have the southern iron available for third and second quarter delivery. There is a belief in some quarters that there is more southern iron unsold for the second and third quarters than is being given out by the southern furnace interests. The reason for this is that third quarter iron at $19.00 is not considered desirable, under the belief that there will be demand enough for this delivery to put the price up close to the $20.00 mark. The furnaces are, therefore, turning away this business, in order to sell the higher on a higher level.

Southern basic iron is reported dull and easy at about $18.00 Birmingham. Spot gray forge is quoted at $17.50 to $18.00, and No. 4 at about 50 cents per ton over forge. We quote for last half delivery delivered Cincinnati as follows:

Southern Foundry No. 1	$22.25 to 22.75
Southern Foundry No. 2	21.75 to 22.25
Southern Foundry No. 3	21.25 to 21.75
Southern Foundry No. 4	20.75 to 21.25
Southern Foundry No. 1 soft	22.25 to 22.75
Southern Foundry No. 2 soft	21.75 to 22.25
Gray Forge	19.75 to 20.75
Northern Foundry No. 1	22.65 to 23.15
Northern Foundry No. 2	22.15 to 22.65
Northern Foundry No. 3	21.65 to 22.15
Jackson County Silvery, 8 per cent	30.15 to 31.15

Finished Material.—There is a firm feeling as to retail prices and jobbers are maintaining the following prices for small lots:

Angles, 3 x 3 and over, 2.15c to 2.25c; beams and channels, 15 inches and under, 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2.10c; 3-16 inch, 2.20c; No. 8, 2.20c; sheets (blue annealed) No. 10, 2.30c; No. 12, 2.35c; No 14, 2.40c; No. 16, 2.50c; box annealed sheets, Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and 26, 2.80c; No. 27, 2.85c; and No. 28, 2.95c. Iron and steel bars, 2.00c base; boiler tubes, 60 per cent off base; turnbuckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting, 45 per cent off list; steel tire, 2.10c base.

Coke.—The market rules easy and prices are lower than a week ago. At the decline in quotations there is more activity and some contracts are being placed for foundry coke for the last half of the year. There is also more inquiry, and there is an undertone of strength in spite of the present weakness. We quote prices in the leading coke producing districts as follows:

Wise County, Va., Furnace Coke, prompt shipment	$2.75 to 2.90 per ton
Wise County, Va., Foundry Coke	3.25 to 3.50 per ton
Pocahontas Furnace Coke, prompt shipment	2.35 to 2.50 per ton
Pocahontas Foundry Coke	3.10 to 3.40 per ton
Connellsville Furnace Coke, prompt shipment	2.75 to 2.90 per ton
Connellsville Foundry Coke	3.25 to 3.60 per ton
New River Foundry Coke, prompt shipment	3.25 to 3.50 per ton
New River Furnace Coke, contract	2.75 to 2.90 per ton

*Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.60 to $1.65 per ton on $9.00 pig iron, plus 17 to 18 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market continues easy and some quotations are lower. We quote:

Old No. 1 R. R. wrought net tons	$17.00 to 18.00
Cast machine and f'dy, net tons	18.00 to 19.00
Old iron rails, gross tons	25.50 to 26.50
Old steel rails, gross tons	18.50 to 19.50
Old short lengths, gross tons	19.00 to 20.00
Old iron axles, net tons	26.00 to 26.50
Heavy melting scrap, gross tons	20.00 to 21.00
Stove plate, net tons	14.50 to 15.50
Wrought turnings, net tons	13.50 to 14.00
Cast borings, net tons	11.00 to 11.50
Car wheels, gross tons	23.50 to 24.00

PHILADELPHIA.

Heavy Chartering of Pig Iron Cargoes.—Market Continues Strong.

April 23.

Pig Iron.—There has been no especially notable feature during the past week in the market, which shows no diminution in its remarkable strength. There is greater activity in buying for the last half, and reports from a large number of furnaces show that they are practically sold up for the remainder of the year. This does not mean, of course, that they can not take on a little more business for third and fourth quarters, but that their margin

for emergency orders is very small. There is a growing sentiment that there is no foundation in sight for the long talked-of slump, and that business may be expected to continue at its present rate at least through 1907. One consumer is known to have ordered 2,000 tons of foundry iron in the Buffalo district for the first quarter of 1908, but he is looked upon as being almost too forehanded for this world. The importations of English and Scotch iron form the basis of the spot market, and from present indications promise to continue indefinitely. Four cargoes, aggregating some 20,000 tons, have been chartered to arrive at this port in May, and the opinion is expressed by one in a position to know that shipments are certain to last as far as November. That will cover about a year of such imports, and will bring them to a period beyond which it is difficult to judge. Spot No. 2X foundry commands from $25 to $26 a ton, and is very scarce, and Middlesboro No. 3 ranges from $20.50 to $21.50, according to the supply on dock. Quotations covering the last half show no substantial change, and may be named as still being within the range given last week, as follows:

No. 1X Foundry	$25.00 to 25.50
No. 2X Foundry	23.50 to 24.50
No. 2 Plain	23.00 to 23.50
Standard Gray Forge	22.25 to 22.75
Basic	23.75 to 24.50
Low Phosphorus	27.00 to 27.50

New Material. — Production continues at the high pressure that has marked the trade for many weeks, without excitement of any kind. Consumption keeps fully up with capacity, and prices remain the same as quoted last week: Beams, channels and angles, according to specifications, 1.83½c to 2c; refined iron bars, 1.88½c to 1.93½c; steel bars, 1.83½c to 1.88½c; plates, 2.08c to 2.13½c.

Old Material.—For the first time in several weeks, there is no decline to be reported in scrap prices. The market is dull, but firm with the mills still inclined to hold off in making purchases. Prices show no variation from last week's quotations as follows:

Old steel rails	$19.00 to 19.50
No. 1 steel scrap	18.25 to 18.75
Old steel axles	22.00 to 22.50
Old iron axles	29.00 to 30.00
Old iron rails	25.50 to 26.50
Old car wheels	22.50 to 23.50
Choice scrap R. R. No. 1 wrought	19.75 to 20.25
No. 1 yard scrap	18.00 to 18.50
Machinery Scrap	21.50 to 22.00
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	16.00 to 17.00
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary	11.50 to 12.00
Wrought turnings	16.50 to 17.00
Axle turnings, heavy	17.00 to 17.50
Cast borings	15.00 to 15.50
Stove plates	17.00 to 17.50

The Gadsden furnace of the Southern Steel Co. has decided to run on foundry as soon as possible. It has been running on basic.

NEW YORK

Foreign Iron Advances.—Improved Demand for Structural Material.

Office of THE IRON TRADE REVIEW,
Room 1315, No. 150 Nassau St., April 23.

Pig Iron.—The foreign situation continues the center of pig iron interest, which has been stimulated by the sharp advance of Friday on the British market, with a further ascending tendency at the opening of the week. On Tuesday No. 3 Middlesbrough closed at 57 shillings, this higher price reflecting the increased demand for shipment to Germany and America. At least three concerns in New York are at present negotiating for the importation of cargoes, although it will be impossible to secure any British iron for early shipment. Selling interests state that the advance will result in higher prices on this side of the water. For No. 3 the price of $20, duty paid tidewater, has prevailed. In domestic irons, inquiry continues good, with a satisfactory volume of business being closed all the while. Pipe making concerns have taken a good tonnage and the other large lots under recent inquiry have been closed for the most part. Basic iron makers in the Virginia field have advanced prices to such an extent as practically to withdraw from the market; in the eastern field the demand for basic is light. We quote second half delivery at tidewater as follows:

Northern Foundry No. 1	$24.00 to 24.50
No. 2 Foundry	23.50 to 24.00
No. 2 Plain	23.00 to 23.50
No. 1 Southern Foundry	22.50 to 23.00
No. 2 Southern Foundry	22.00 to 22.50
No. 3 Southern Foundry	21.50 to 22.00
No. 4 Southern Foundry	21.00 to 22.00

Finished Materials.— The Pacific coast, particularly the Portland and San Francisco sections, have loomed up of late as an important market for structural materials. In the latter it appears that the period of temporary building is over and that from now on the reconstruction of the city will call for good tonnages of steel. In the New York district there is excellent business in prospect, but current bookings are not large. Extensions of the subway will eventually require in the neighborhood of 80,000 tons of shapes and plates, but months will probably elapse before much of this tonnage is let, as the general contractors' bids have just been received. The largest individual contract closed during the week under review is for 5,000 tons of structural materials for the open-hearth steel plant to be erected by the Pittsburg Steel Co. The contract was taken by the Riter-Conley Mfg. Co. The McClintic-Marshall Construction Co. has secured the Michigan Central order for about 3,500 tons, and Milliken Bros. will furnish the steel for the Van Schaick building in New York City, about 2,000 tons. The Phoenix Bridge Co. has taken about 800 tons for the Southern Railway. In the San Francisco field, Milliken Bros. have taken a number of medium-sized structures, and the American Bridge Co. has secured the Delger building, about 1,000 tons. Other bookings of the American Bridge Co. include the following: The Dean building at Kansas City, 400 tons; the Olson building in New York, 850 tons; B. & O. bridge requirements, 200 tons; additional bridge work for the Chicago Junction Railway, 1,100 tons; a Philadelphia building, 1,500 tons; and the Masonic Temple at Washington, D. C., 850 tons. Many smaller contracts have been closed. Two months ago, it is pointed out, structural mills were plainly worried over the scarcity of orders and feared that they would not have enough work to run full time. Since that time, in spite of wide reports of retrenchment by railway interests and tight money difficulties on the part of builders, the situation has radically changed and today mills are crowded with specifications, with enough work in sight to insure capacity operations well into the future. The smaller building operations, taken largely by the less conspicuous construction companies, frequently at extremely low prices, have been responsible for the reversal of conditions.

In bar iron there is little present activity, although specifications are insistent. There have been some reports of late to the effect that slight concessions have been made from the basis of 1.70c Pittsburg, but on investigation these sales prove to have been made in a way that bars them from consideration as indicating the trend of the market.

Current orders of plates include no large tonnages, but aggregate a very fair tonnage. There is still a willingness to pay handsome premiums for prompt delivery, one interest reporting a sale of a moderate tonnage for delivery within a week at a premium of $8.00 a ton. Another case has come to light where plates needed immediately for ship repairs were not only secured at a heavy premium, but were shipped by express from the Philadelphia district to New York at a transportation cost of about $20 per ton. We quote tidewater prices as follows:

Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.94½c; marine boiler, 2.24½c; refined iron

bars, 1.89½c; soft steel bars, 1.74½c; sheets, No. 28, black, 2.60c.

Old Material.—The local market is quiet with certain lines slightly lower. No general recession in prices has set in, but it is stated that mills are not buying so heavily as some weeks ago, and lower levels are to be expected. We quote gross tons, New York delivery, as follows:

Old iron rails	$24.50 to 25.50
Old steel rails, long lengths	18.00 to 18.50
Old steel rails, short pieces	16.25 to 16.75
Relaying rails	28.00 to 29.00
Old car wheels	24.00 to 24.50
Old iron car axles	28.50 to 29.50
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	16.00 to 16.50
No. 1 railroad wrought scrap	19.00 to 19.50
Iron track scrap	17.50 to 18.00
Wrought pipe	14.50 to 15.00
Cast borings	13.50 to 14.00
Wrought turnings	14.75 to 15.25
Heavy cast scrap	19.00 to 19.50
Railroad malleable	17.00 to 18.00
Agricultural malleable	14.50 to 15.00
Stove plate	15.50 to 16.00
Grate bars	14.50 to 15.00

BUFFALO

More General Selling for Last Quarter.—Market is Strong.

April 23.

Pig Iron.—A slight tendency toward firmer prices and a market of somewhat stronger tone is observed here this week, with a more general selling into the last quarter. Inquiries for large lots continue coming in. No prompt iron is offered at the local furnaces at present, but the valley furnaces have just offered small lots for delivery in May, June, and July. These offers are chiefly of No. 2 foundry, which is quoted at $22.75 at furnace. To this must be added $1.40 freight charges. The prices on various small lots offered for May delivery range from $22.75 to $23.50.

Local furnaces report the demand for No. 2 Foundry quite strong and most grades have been covered to the last quarter. There may be odd lots of iron for sale prior to that time, but as to this there is nothing certain. Buyers have been pretty well taken care of lately and it is believed that the more general buying indicates more confidence among consumers. There appears to be some reason to believe that the market is adjusting itself into a more restful condition, but the strength of the market has by no means diminished. Prices, however, have undergone no change. We quote for last half delivery as follows:

No. 1X Foundry	$22.75 to 23.25
No. 2X Foundry	22.25 to 22.75
No. 3 Foundry	21.50 to 22.00
No. 2 Plain	22.00 to 22.50
Malleable Bessemer	22.50 to 23.00
Gray Forge	21.50 to 22.00
Charcoal	26.00 to 27.00

The Port Henry, N. Y., furnace of the Northern Iron Co., has been blown out for a relining and thorough overhauling.

ST. LOUIS.

Pig Iron Market Strong.—Coke Prices Have Not Advanced.

April 22.

There is nothing startling in the iron market, but the trend is strong.

Pig Iron.—Prices for No. 2 f. o. b. Birmingham for prompt shipment range from $22.50 to $23, and from $21.50 to $22 for May and June. The last half is stationary with little to be had at $18.50. Considerable buying was reported last week for the second quarter and the last half. Inquiries were more numerous. Our quotations, including the freight rate of $3.75 from Birmingham, range as follows:

Southern No. 1	$23.00 to 23.50
Southern No. 2	22.50 to 23.00
Southern No. 3	22.00 to 22.50
Southern No. 4	21.50 to 22.00
Gray Forge	19.75 to 20.25

Coke.—The prices have not stiffened. Considerable business was placed last week for foundry and furnace grades. One order was received for April shipment for 2,500 tons of furnace coke. Several large consumers closed contracts for the year's requirement of 72-hours foundry. Prices of best selected Connellsville 72-hour foundry range from $3.25 to $3.75 for immediate and future shipment. Connellsville 48-hour furnace coke ranges in price from $2.50 to $2.60. The rate for Connellsville coke, ovens to East St. Louis, is $2.80; to St. Louis, $2.90.

Structural Steel.—The market is reported stationary. Several steel business and office buildings are in an embryonic state, but nothing definite concerning contracts for their erection has developed.

BIRMINGHAM, ALA.

Prices Are Hardening.—Inquiries Numerous.—Increased Coke Production.

Birmingham, Ala., April 22.

A change in quotations of pig iron in the Birmingham district was announced last week, third quarter iron at $18.50 per ton, No. 2 foundry, being out of the question. It was stated further that very few of the furnace companies were quoting the fourth quarter at $18.50 per ton, the regular price being $19 for No. 2 foundry. Very little trading is to be noticed going on in this district in spot iron. Spot prices are still strong, the earlier the delivery the better the price. The production in the southern territory is no better than it has been for the past few weeks and is the only objectionable feature to the otherwise happy condition in the iron market. The Alabama Consolidated Coal & Iron Co. had an accident at its Gadsden furnace plant, some steam pipes bursting the first of the week and causing a shut down of the iron-maker for a few days. Every day's shut down counts these days. The Shelby Iron Co. has started up its second furnace on coke, the other stack producing charcoal iron.

The transportation facilities continue to be strong and the expectation as to clearing off the yards of accumulated iron and cast iron pipe will be realized by the second week in May, if not before.

Inquiries are still lively and there is positively no doubt that a large quantity of iron is needed by consumers. Some inquiry has been received in this section for 1908 deliveries and some orders have been accepted.

Preparations are being made for a larger coke production in Alabama, contracts having been made recently for the erection of a couple of hundred new coke ovens during the summer. The coke production in Alabama during the past year amounted to 2,939,090 tons. It is predicted that the output this year will go to 3,500,000 tons. The coal production last year in Alabama according to the corrected figures went to 12,761,935 tons and the expectations for this year place the output at 15,000,000 tons.

BRITISH IRON MARKET.

Extraordinary Shipments to America. Rapid Decline of Stocks.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.
Birmingham, Eng., April 12

The condition of the pig iron market is exceptionally interesting to the Midlands just now, owing to the arrival of Quarter day tomorrow. Fortunately for sellers, the last few days has seen a remarkable increase of strength, with a corresponding improvement in prices. Thus Cleveland prices which on Friday were £2 13s 7d ($13.12) cash, are today £2 15s 6½d ($13.59), with a turnover of 20,000 tons. The sudden rise appears to have taken some people by surprise, and there is now an eagerness to renew orders. Shipments are on an extraordinary scale, both to America and on the continent, Germany and Italy being very good buyers. Since the beginning of April, the warrant stock has declined 2,000 tons a day. Still heavier orders are expected from America. The natural effect of this has been to stimulate buying in the Black country, and consumers are hastening to renew their contracts. The trade done since the beginning of the year, of which figures have just been published has been the

largest on record. So far the clearances from stores have been 109,340 tons, an increase of 41,504 upon last year. Last week's shipments were 10,000 tons against 4,120 tons for the corresponding period of last year, and during March the decline in Connal's stores was 37,257 tons, leaving 440,469 tons in stock. For the three months the shipments have been 404,870 tons, and during March 146,978. These figures leave all previous records in the rear. Many of the furnaces in Derbyshire, Northamptonshire, and Staffordshire are so much in arrears with their deliveries that they are declining orders with new customers, restricting themselves to renewals of contracts. Practically, no iron is going into store. It is expected that a very big trade will be done at the quarterly meeting tomorrow. Yesterday's business at Glasgow comprised 40,000 tons, and there was an increase in price of 6d on the day.

METAL MARKET.

NEW YORK.

April 23.

Copper.—The market is little stronger than a week ago, with electrolytic for April delivery changing hands on the basis of 24c f. o. b. New York. The lower price has resulted in the placing of some delayed requirements, but current business is by no means large. We quote as follows: Lake, 25c to 25½c; electrolytic, 24c to 24½c; casting, 21½c to 23c. Some lake interests are holding at 26c. On the London market yesterday both spot and future deliveries closed at £99 15s.

Pig Tin.—The London market continues on the old level and there is only a moderate demand in the local market. For early shipment the basis is about 40.25c. The spot market in London closed yesterday at £186 10s. Exports from the Straits are much less than in 1906.

Pig Lead.—No change is manifested in the market, the price of 6.00c New York prevailing. Spot is reported exceedingly scarce in the British market, soft Spanish being slightly higher.

Spelter.—Consumers are well covered for their present needs and are withholding further purchases. Refined is lower at 6.65c to 6.75c, New York. G. M. B. in London is unchanged.

Antimony.—We quote: Cookson's 23c to 24c; Hallett's, 22c to 22½c; ordinary brands, 21c to 21½c.

CHICAGO

April 22.

No changes in prices or conditions were apparent in the metal market during the week. Slightly larger purchases were made by some of the railroads, but large buyers as a rule continued to supply only current needs.

Copper Lake sold for 26c, and castings for 25½c and 26c. Pig tin varied between 43c and 43½c according to quantity purchased. Sheet zinc was quoted at 8.50c LaSalle in car lots of 600-pound casks. Spelter continued at 7¼c. Lead desilverized in 50-ton lots sold between 6.50c and 6.60c, and corroding between 7.25c and 7.35c. In carload lots the price was 2½c per 100 pounds more. Cookson's antimony sold for 28½c and other grades for 26c.

The downward tendency in price of old metals seems to have ceased during the past week. Prices in general ruled the same as in the preceding week.

Prices quoted by buyers were: Copper wire, 18.50c to 19c; heavy copper, 18c; copper bottoms, 17c; copper clips, 18c to 18.50c; red brass, heavy, 17c; yellow brass, heavy, 14.50c to 15c; red brass, borings, 15c to 15.50c; yellow brass borings, 13c to 13.50c; light brass, 12c; pipe lead, 5.25c; tea lead, 5c; zinc, 5c; tin foil, 32c; pewter, No. 1, 27c.

ST. LOUIS.

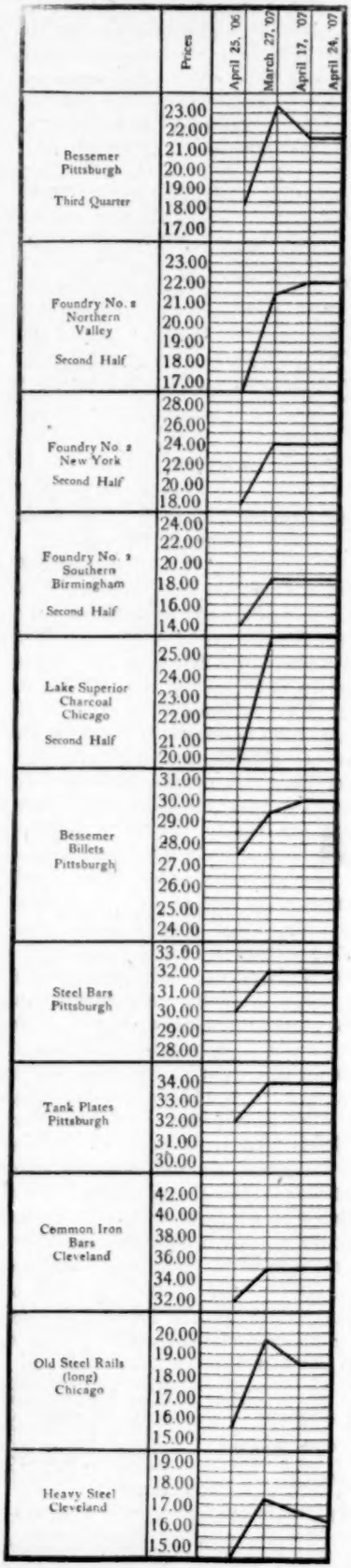
April 22.

Lead and Zinc.—The sixteen weeks of 1907, ending Saturday night, mark an average increase in zinc-lead values in the Joplin district of $92,963 per week over each of the first sixteen weeks of last year. The shipments were on the average and prices were good with an improved demand. The highest price for zinc ore was $52 per ton on an assay basis of $47 to $50 per ton of 60 per cent zinc. The highest price paid for lead was $82 per ton, with a slight decline toward the end of the week.

Zinc ore sold $5 and lead ore $4 per ton higher than a year ago, and the week's shipments were 1,152,730 pounds in zinc, and 278,840 pounds in lead, greater than the same week of last year.

New Piano Plate Plant.—The Superior Foundry Co., Cleveland, has completed plans for its new piano plate factory additions to the present plant, as follows: Main foundry building, 190 feet x 176 feet; pattern vault, 25 feet x 50 feet; finishing building, 288 feet x 55 feet; chipping and cleaning building, 95 feet x 100 feet; carpenter and pattern building, 48 feet x 64 feet. These buildings are to be fire proof in every respect, and equipped in every way with the most modern machinery.

PRICE CHART.


Prices
April 25, '06
March 27, '07
April 17, '07
April 24, '07
Bessemer Pittsburgh Third Quarter
23.00 22.00 21.00 20.00 19.00 18.00 17.00
Foundry No. 2 Northern Valley Second Half
23.00 22.00 21.00 20.00 19.00 18.00 17.00
Foundry No. 2 New York Second Half
28.00 26.00 24.00 22.00 20.00 18.00
Foundry No. 2 Southern Birmingham Second Half
24.00 22.00 20.00 18.00 16.00 14.00
Lake Superior Charcoal Chicago Second Half
25.00 24.00 23.00 22.00 21.00 20.00
Bessemer Billets Pittsburgh
31.00 30.00 29.00 28.00 27.00 26.00 25.00 24.00
Steel Bars Pittsburgh
33.00 32.00 31.00 30.00 29.00 28.00
Tank Plates Pittsburgh
34.00 33.00 32.00 31.00 30.00
Common Iron Bars Cleveland
42.00 40.00 38.00 36.00 34.00 32.00
Old Steel Rails (long) Chicago
20.00 19.00 18.00 17.00 16.00 15.00
Heavy Steel Cleveland
19.00 18.00 17.00 16.00 15.00

SUSPENDED OPERATIONS

Cause Some Comment, But Activity is the Rule on Marquette Range.

(Special Correspondence.)

Ishpeming, Mich., April 19.—The suspension of operations at the Oliver Iron Mining Co.'s section 21 mine, and the curtailment of the forces at the Regent group, also operated by the Steel Corporation, has caused no little apprehension as to what new phases will develop before the close of the coming season of navigation in the mining industry on this range. The mining company gives as its reason for the suspension of section 21 and the curtailment of the Regent that there is a heavy over-production of the class of ore mined at these properties.

Ore of similar quality is produced at a number of the company's Mesabi range mines, also at some of its properties on the other Lake Superior ranges. Preparations had been made during the winter for improvements at both of the mines mentioned. A new dry house, engine house, offices, and other structures were to be erected, but despite the fact that the plans have been prepared and part of the building material has been delivered, the work may be deferred until later in the season, or perhaps a year hence.

There are no indications at this time of a general curtailment at the mining properties on this range. In fact, there never was a time when more extensive development and exploratory operations were being conducted, nor has the daily tonnage of ore produced ever been as great as now. The Oliver Iron Mining Co., the Cleveland-Cliffs Iron Co. and the Pittsburg & Lake Angeline Iron Co., the three principal operators in this field, are working large forces at their producing mines and a greater number of men in exploratory departments than ever before. During the past two years more new mines have been opened on the range than during any similar period since the opening of the district. A number of old properties are again active and it is anticipated that several producers will be added to the list before the close of the present year.

It is very generally understood that the Cleveland-Cliffs Iron Co. has discovered large deopsits of ore in its Swanzey district, where from 15 to 25 diamond drills have been in constant operation for the past four or five years, and where two mines, the Austin and Princeton, are being operated with large forces, and the Smith is in the development stage, but soon to become a producer. A number of buildings are just being completed including a central power station at Princeton, and a general office, that will be as well equipped structures as have been built in this section. Several auxiliary power plants for the different mines are also being installed and a great deal of other new work has been mapped out. A town site, about a half mile from the Austin and a mile from the Princeton locations, is being platted by the Cleveland-Cliffs Iron Co. This is to be a model town, with unusually wide streets, electric lights, and sewerage and water works at the start, and the system of building macadam streets so successful in Ishpeming is to be introduced and no timber, except that which is absolutely necessary, is to be removed from the town site. The town is located between the Escanaba river and its east branch, the distance between the streams at that point being less than two miles. The Marquette & Southeastern railway, recently completed to that district, will handle the ore produced at the Swanzey mines.

There will be greater activity than ever before at the mines east of the city of Negaunee, including properties on the Cascade range. The Jones & Laughlin Steel Co., which less than two years ago began the development of the old Rolling Mill property, owned by Captain Samuel Mitchell of Negaunee, has a working shaft over 700 feet in depth and four drifts have penetrated the ore bodies. The working force at this mine is to be considerably increased as soon as the shipping season opens. The mine is well equipped with new machinery and within a few years it should be one of the largest producers of the district, as there is known to exist both near surface and at a depth some very large ore deposits. An open pit, operated some years ago by Mr. Mitchell, is to be reopened the coming summer.

The Breitung interests of Marquette, operating under the Mary Charlotte and Breitung Hematite Mining Cos., have developed good property in the Mary Charlotte mine. There are at present over 500 men employed at this mine, and a new shaft, making the third, is being sunk. It is anticipated that the season's output will be swelled to about 40,000 tons, or over 150,000 tons in excess of last season.

The Cleveland-Cliffs Iron Co. has done some extensive development work at its Maas mine in Negaunee, the past year or so. At the Maas mine the most pretentious buildings on the range have been erected during the past eighteen months and a splendid equipment of hoisting and other machinery, also a steel shaft house, have been provided. The Maas shaft, sunk through a basin of quicksand over 200 feet deep and nearly three years under construction, reached a depth of 700 feet last fall, when drifts were started toward the ore bodies. These were reached some weeks ago and ore is to be hoisted within a few weeks when the new machinery is ready to go into commission. The Maas and Negaunee mines, both operated by the Cleveland-Cliffs Iron Co., were a short time ago connected by drifts, though the shafts are over a mile apart. The Maas promises to become one of the largest producers in the Negaunee district and its ore is of better quality than the average mined at any of the other properties in that city.

INCREASED FREIGHT RATES ON IRON AND STEEL.

The schedule for the advanced freight rates on iron, steel and coke effective June 1, 1907, as previously stated in THE IRON TRADE REVIEW, has been issued. The revised tariff on pig iron, billets and cinder from Pittsburg to many of the important shipping centers of the iron and steel industry is as follows:

Pittsburg to—	Pig iron.	Billets.
New York	$2.45	$2.60
Baltimore	2.15	2.30
Philadelphia	2.25	2.40
Buffalo	1.75	1.80
Rochester	1.80	1.90
Syracuse	2.10	2.20
Richmond, Va.	2.65	2.80
Chicago	2.80	3.00
Cincinnati	2.20	2.40
Cleveland	1.40	1.50
Columbus	1.60	1.90
Dayton	1.85	2.20
Detroit	2.15	2.25
Erie, Pa.	1.40	1.50
Indianapolis	2.20	2.65
Louisville, Ky.	2.80	3.00
Portsmouth, O.	2.10	2.30
St. Louis	3.50	3.80
Toledo	1.75	1.95
Youngstown	.90	1.00
Wheeling, W. Va.	.90	1.00
Steubenville	.80	.90

The rate on coke from the Connellsville region to Pittsburg will be 75 cents after June 1; to the Mahoning and Shenango valleys, $1.35; to Cleveland, $1.65, and to Bellaire, $1.30. On cinder the rate from Pittsburg to New York will be $2.45; to Baltimore, $2.15; to Philadelphia, $2.25; to Buffalo, $1.55; to Rochester, $1.80; to Syracuse, $2.10; to Richmond, Va., $2.65c, etc.

Strikes American Machines.—American machinery interests are vitally concerned in the so-called patents and design bill, introduced during the week in the British House of Commons by the president of the London Board of Trade. The measure aims to compel foreign manufacturers who have obtained patent rights in Great Britain to manufacture in that country the machines which they sell or lease there, and seeks to prevent the supplying of British factories with American-made machines. The measure has the support of both political parties and will probably become a law, as in some quarters there is agitation for even more stringent regulation.

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HEAVY DRAWBACK OPERATIONS.

There has been of late a very great increase in iron and steel operations under the drawback provision of the tariff law, drawback being allowed, in the fiscal year, 1906, on over 150,000 tons of iron and steel, or on more than double the quantity involved in any year prior to 1903.

The first drawback legislation was in 1861, a law being passed whereby drawback would be allowed on articles made wholly from imported materials on which duty has been paid. The idea was to extend to manufacturers the advantages of the bonded warehouse system. Afterwards the scope of the law was extended, and finally the general drawback provision was incorporated in the McKinley law, passed in 1890. This provides for a drawback of 99 per cent of the duty originally paid provided that the imported material used "shall so appear in the completed articles that the quantity or measure thereof may be ascertained." Without modifications this provision has been incorporated in the tariff acts subsequent to that of 1890.

The object of the treasury department has been to make the application of the law as broad as possible, subject to the necessity of preventing the possibility of misrepresentation. Accordingly, various rulings have been made from time to time whereby imported material could be identified in an exported article even though it were not actually visible. Operations under the drawback law have been thereby greatly extended.

Tin plate was subject to drawback before the McKinley law, and remains to this day the most important single article on which drawback is allowed.

In the fiscal year 1900 the total drawback allowed on all articles was $5,430,398; of this amount $1,848,792 was allowed on tin plates, while on other iron and steel, neglecting a few cases in which tonnage was not reported, drawbacks amounting to about $115,000 were allowed. In 1906 the total drawback allowed was $5,831,125, tin plates constituting $1,788,762 of the total, while other iron and steel amounted to about $465,000, the allowance on iron and steel, outside of tin plate, having thus quadrupled from 1900 to 1906.

A table is presented herewith, showing the weight of all iron and steel products on which drawback has been allowed in the past seven years. This table omits a few minor items, for which the tonnage is not reported. It will be observed that in 1900 drawback was allowed on about 56,000 tons of tin plate, and on only 6,000 tons of all other iron and steel products. In 1906 the tin plate tonnage was about the same, while the other articles had increased from 6,000 to 100,000 tons.

There is no perfect law; to every law there is objection at some point. The drawback arrangement serves to reduce the objection to the protective tariff law, in giving manufacturers practically duty-free iron and steel under certain conditions. The reduction of the objection is a measurable one when it affects more than 50,000 tons of tin plate, and more than 100,000 tons of other iron and steel products.

The United States is, in a measure, passing to the condition of England, in that its imports are increasing, and not at the expense of domestic manufacturers. It is becoming more a trading nation, in the sense that it imports material at a certain stage of manufacture and exports it at a more advanced stage. Iron and steel interests operating under the drawback law are really operating on a free-trade basis, so far as their exports are concerned, and they are doubtless buying their foreign materials at a lower rate than they would, were there no tariff at all.

In 1906 drawback was allowed on 80,000 tons of pig iron, against 50,000 tons in 1905 and less than 15,000 tons in any preceding year. Doubtless the tonnage would have been less had pig iron not been so scarce in this country, yet it is certain that this drawback movement has come to stay. A considerable part of what is reported under pig iron is spiegeleisen, and a limited tonnage is doubtless ferro-manganese. The duty on ordinary pig iron, on ferro-manganese and on spiegeleisen is the same, $4 a ton, and the government therefore does not separate the items.

Scrap, when not fit to be remanufactured, is dutiable at $4 a ton, and the 12,257 tons of scrap on which draw-

IMPORTS ON WHICH DRAWBACK WAS ALLOWED; GROSS TONS; FISCAL YEARS.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Iron Ore	17,043	183,693	271,228	5,247	6,024	186,471	283,536
Ferro Manganese	0	60	106	1	*	*	*
Pig Iron	112	4	3,968	8,560	14,561	49,774	80,069
Scrap	†	8,534	1,987	2,675	2,350	6,835	12,357
Billets, etc.	590	38	19	26,481	14,171	149	6,170
Rods	6	61	0	1,282	150	75	135
Rails	4,445	302	4	773	17	70	542
Bar Iron	148	33	4	76	29	1,685	130
Structural	0	0	0	855	3,658	1,823	1,385
Sheets and Plates	†	†	69	536	1,814	777	298
Tin Plates	55,924	56,813	55,956	54,950	49,847	67,713	53,775
Taggers' Iron	168	174	183	115	0	0	0
Wire	197	178	540	130	236	439	212
Tubing	40	27	27	8	0	0	0
Hoops, Etc.	0	0	0	2,149	785	170	126
Wheels, Tires, Axles	317	185	121	385	829	669	399
Totals	61,947	66,409	62,984	98,976	88,447	130,179	155,598

*Included in pig iron.
†Tonnage not stated.

back was allowed in 1906 was doubtless remelted. Old rails fit to be rerolled are dutiable as new material, at $7.84 per ton, and the limited tonnages of rails on which drawback was allowed were no doubt rerolled. A larger tonnage of old rails, fit only for remelting, was probably included in scrap.

Nearly a million tons of iron ore were imported in the fiscal year 1906, and on more than one-fourth of this, or on 283,536 tons, drawback was allowed. Manganese ore is not included in iron ore imports, nor is drawback allowed, as it is free, ordinary iron ore being dutiable at 40 cents a ton, from which 20 per cent is deducted in the case of Cuba, through the reciprocity treaty.

MR. TAYLOR'S GENEROUS GIFT.

We publish this week the last section of Mr. Taylor's great paper entitled "The Art of Cutting Metals." Those who have been following it as it has appeared from week to week in THE IRON TRADE REVIEW, and those who have read it in the proceedings of the American Society of Mechanical Engineers are fully acquainted with the incalculable value of the work, but to those who are not fully informed in regard to it, it seems fitting to point out the more important features in order that they may know the practical worth of the most important contribution ever made to engineering literature.

A brief resume of the inception and scope of Mr. Taylor's work will not be out of place. While acting as the newly-appointed foreman of a machine shop, he found a conspiracy of the men to limit the output. Owing to their superior knowledge of the quality of the tools and of the material upon which they were working they were able to accomplish their object. Mr. Taylor, therefore, secured permission to institute a series of experiments to give him a knowledge equal at least to that of the men, regarding the tools, speeds, feeds, etc., with which they were engaged, in order that he might combat any attempts to produce less than the maximum possible output of the shop. The experiments originally planned to last at the most a few months extended over a period of 26 years and involved the services of not only Mr. Taylor but also of a large number of highly trained and technically educated men. The range of subjects necessary to be investigated increased rather than diminished as the work progressed, and in the end they found that no less than 12 variables which had an effect upon the cutting speed of a tool existed. These involved, among others, the quality and the dimensions of the piece of metal being cut, the depth and thickness of cut, the shape and composition of the tool, the duration of the cut and the construction of the machine.

The net result of these investigations has been the discovery of laws, facts and steels which have doubled the output of a given machine over that which was formerly deemed possible. The discovery of the high speed steel used today in every machine shop in the world which claims to have any degree of progressiveness was only an incident in the course of the investigation. The development of the Taylor system of shop management, which, although not yet so well known as the high speed steel, but which has increased many times the output of the shops where it is employed, is also a result of the experiments.

To revert to the paper itself, one section of it gives in detail the methods and precautions to be employed in the conduct of an experimental investigation. This particular section may not be so interesting perhaps to shop owners, superintendents and foremen as those which immediately follow it. The proper shape for standard shop tools is the subject of a section of the paper, which, however, is of direct interest to every person who has anything to do with the cutting of metals. More considerations are involved in this subject than would be imagined, and the author has developed a tool which gives the maximum amount of work with a minimum expense for forging and grinding, and which also is designed to have the longest possible life, thus economizing expensive tool steel. Mr. Taylor did not deem it enough to discover the proper shape of a tool, but he also investigated the proper way to forge and grind the tool, and in his paper he gives detailed directions for performing these operations, so that there is no excuse for any shop not having tools properly adapted to its work. A practical conclusion derived in the experiments was the length of time that a tool should run without regrinding, and Mr. Taylor discovered and reduced to a dollars and cents basis how long a tool should be used before it is replaced with a sharp one.

For the benefit of those who have not the time nor patience to study his entire work, the author has prepared a set of practical tables showing the approximate cutting speed at which the different sized tools can be run in different qualities of material and with different depths of cut and varying feeds. These cutting speeds are much higher than those ordinarily used in machine shops, and if the owner of a shop used these tables and no other part of Mr. Taylor's work, he would achieve great benefits from the patient investigations conducted by Mr. Taylor and his associates. In connection with the tables are presented formulae by means of which the exact cutting speed can be calculated by those who so desire. The concluding sections of the paper review the development of tool steel and the treatment which it should undergo, in order to accomplish maximum results. The analyses of a large number of tool steels are given, together with that of the newest steel developed late in 1906, which is far better than any heretofore used.

The above is but a brief outline of the more important points of Mr. Taylor's paper. The title of the paper does scant justice to the scope of the work which it records. No manufacturer engaged in the working of iron and steel in machine tools can afford to neglect the lessons it presents. By following out the conclusions arrived at in it, the output of shops can be doubled with the same number of men, thus doubling the value of these men to the nation. Mr. Taylor's work is a service not only to engineering but to mankind in general, and not the least commendable feature of it is the

generous gift of the results of all his studies for the free use of any who care to benefit by them.

The New York offices of the Penton Publishing Co., publisher of THE IRON TRADE REVIEW, the *Foundry*, the *Marine Review*, and *Boating*, have been removed from their former location at 150 Nassau street, to the tenth floor of the new West Street building, corner Cedar and West streets.

New Castings Company.—The Columbus Malleable Castings Co., Columbus, O., has been incorporated with a capital of $250,000, and will operate a malleable steel castings plant in that city. The concern has taken over the plant of the Columbus Malleable Iron & Steel Castings Co., which it will remodel into a modern iron plant. The incorporators are C. H. Boardman, president of the Murray City Coal Co.; C. Christian Born, vice president of the Hoster-Columbus Associated Breweries Co.; J. D. Ellison, vice president of the Ralston Steel Car Co.; J. D. Price, of the Orr, Brown & Price Co., and D. H. Taft, of the Dunn, Taft Co. C. H. Boardman has been elected president and C. Christian Born vice president and treasurer. The offices of secretary and general manager were not filled, but it is expected that E. A. Cope, of Cincinnati, will be chosen secretary, and that F. J. Newman, a well known iron man of Columbus, will be the general manager. The board of directors consists of C. H. Boardman, C. Christian Born, J. D. Price, Daniel H. Taft and J. D. Ellison.

Mining Show Closes.—After running about half of the two weeks for which it was originally planned, the Mining Show at the Grand Central Palace, New York, closed Monday night, it being stated that the venture was a heavy financial failure. The show was promoted by an incorporated concern known as the American Mines Exhibition Co.

Charges Discrimination.—Before a special commissioner for the Interstate Commerce Commission at New York April 19, a hearing was held in the case of the Cambria Steel Co. against the Great Northern Railway. The steel company, which was represented by H. S. Endsley, made the charge of excessive discrimination, contending that it should be allowed to carry its 60-foot rails at the minimum freight rate of 60,000 pounds.

SATISFACTORY START

Made by the New York State Steel Co.—Important Additions Are Planned.

Buffalo, April 23.—The New York State Steel Co., is now operating one of its two large Talbot open-hearth furnaces with fine success and in three weeks it is expected the other furnace will be ready to pour its first heat. Foundations for the blast furnace are building and this is scheduled to be blown in Jan. 1, 1908. Monday evening the 100th ingot was rolled and not one cobble occurred since the first billet was made last Thursday night. The fact that every part of the mechanism has operated without the slightest mishap since the wheels were first turned over is a source of much pride to the officials of the plant. At present the output of the plant will be confined to billets, blooms and slabs for which it has a capacity of 800 tons a day by working two shifts.

There are a number of large buildings yet to be built by the company. One of these will probably be a rail mill, as the company proposes in the future to add this industry. Plans have been prepared for extensive dock facilities along its frontage on Buffalo river so that ore carriers may have access to the property. There are a number of improvements under consideration which will, when completed, make the New York State Steel plant a $7,000,000 proposition.

One of the most interesting features of the opening of the new steel plant and one which especially interests builders of open-hearth furnaces is the Talbot furnace which is now pouring the steel for this company. It is one of the largest in the country, a twin to the one they are now completing. It is 53 feet between ports and is electrically operated. Instead of hydraulic power in opening and closing the furnace doors electricity is used with very satisfactory results. The builders of the furnace claim this to be a distinct innovation in furnace building. Ground was broken for this plant December 5, 1905, and the building has progressed with much expedition. Both Talbot furnaces have been constructed since the first of the year. Spencer Kellogg Jr., vice president; Howard Kellogg, director; R. R. Hillman, manager, and F. E. Porter, superintendent, made an inspection of the plant Monday afternoon.

Charles A. Potter, a salesman for the Bourne-Fuller Co., Cleveland, since 1901, died at Sandy Lake, Pa., April 14, aged 26.

SHOWS BIG GAIN.

The annual report of President Robert E. Harris, of the Nova Scotia Steel & Coal Co., for the year ended Dec. 31, 1906, shows gross profits of $960,281, an increase of $400,375 over 1905. The net profits, after allowing for interest on bonds, depreciation, sinking fund, etc., amounted to $467,860, an increase of $285,884. The surplus for the year foots up $385,460, an increase of $99,576; making the total surplus to date $1,180,785. In his report to stockholders, Mr. Harris says: "The total volume of business transacted by the company during the past year was considerably larger than that of any previous year, although, owing to the blast furnace at Sydney mines being out for relining during the months of November and December, the output of pig iron was slightly less than during the previous year. The sales for the year increased $956,000 over the preceding year."

BIG JAPANESE ORDER.

The Japanese government, through the United States Steel Products Co., a subsidiary organization of the United States Steel Corporation, has just issued an order for railway equipment and materials amounting to $9,000,000. One portion of the order is for 51,000 tons of steel rails in 80-pound sections and track fastenings, most of which will be supplied by the Carnegie Steel Co. In addition another contract calls for 15,000 tons of steel rails in 60-pound sections. The American Bridge Co. is to build 486 bridges of single span ranging in length from 7 to 105 feet, and will also make three 50-foot turntables for use on the Imperial Government railroad. Two complete electric lighting plants were included in the order. One of these will be furnished by the Westinghouse Electric Co. and the other by the General Electric Co. The American Locomotive Co. at its present plant will build five locomotives.

Form Belgium Syndicate.—The scheme for the formation of the Belgium steel syndicate has now been brought to a successful issue, say cable dispatches, in so far as it concerns an agreement between the interested works. There are the Cockerill Co., the Ougree Works, the Angleur Works, Esperance-Longdoz, Sambre & Moselle, Thy-le-Chateau, Providence, Couillet and G. Boel. The project comprises the regulation of the production and the establishment of a sales bureau for undertaking business on the common account of the constituents, but the actual formation of the bureau will not take place until the German Steel Syndicate has been renewed.

BOILER MAKERS

Will Join in Convention.—Consolidation Planned.

The International Railway Master Boiler Makers and the Master Steam Boiler Makers' Association will meet in joint session in Cleveland, May 21, 22 and 23, with official headquarters at the Hollenden hotel. The primary object of the joint convention will be to perfect if possible the consolidation of the two organizations, whose purposes are largely identical. Between 500 and 600 members have signified their intention of being present. The program for the convention, as far as it has been completed, is as follows:

Tuesday, May 21.

Convention assembles at 10 A. M.
Opening prayer by the Rev. Charles B. Mitchell.
Address of welcome by Mayor Tom L. Johnson.
Address by J. F. Deems, S. M. & P., and R. S. N. Y. C. lines.
Reply by President J. H. Smythe of the Master Steam Boiler Makers' Association.
Address by Mr. Harry D. Vought, prominent R. R. club secretary.
Reply by President C. L. Hempel of the I. Ry. M. B. M. A.
Address by President Smythe.
Address by President Hempel.
Announcements of Secretaries.
Assemble in Convention Hall at 2:30 P. M. for the purpose of visiting the L. S. & M. S. Collinwood shops.

Wednesday, May 22.

Convention called to order by Presidents Smythe and Hempel at 9:30 A. M.
Unfinished business.
New business.
Reports read and discussed.

Thursday, May 23.

Convention called to order by presidents.
Open discussion of "Shop Practices."
The afternoon to be devoted to the discussion of association affairs, receiving reports of committees and the election of officers.

Turbine Installations.—The General Electric Co., Schenectady, N. Y., will install temporarily the 2,000-kilowatt Curtis turbine ordered for the Indiana Steel Co., Gary, Ind., at the South Chicago works of the Illinois Steel Co., for generating current to drive the new universal plate mill at that plant. Turbines of this type have also been installed by the General Electric Co., at Denver, Colo.; Portland, Ore.; Los Angeles, San Francisco, Seattle, Great Falls, Mont.; Salt Lake City; Kansas City; St. Joseph, Mo.; Lincoln, Neb., and several other western points.

Plow Makers Organize.—J. A. Craig, representing the Janesville Machine Co., Janesville, Wis., has been elected president of the National Plow Association, recently organized at Chicago by prominent plow manufacturers of the west to further the interests of the members regarding raw material and other manufacturing products. The other officers are: W. H. Taylor, Peoria, Ill., vice president; W. I. Bogardus, Springfield, Ill., secretary, and W. B. Printon, Dixon, Ill., treasurer.

NATIONAL METAL TRADES ASSOCIATION NOTES.

The executive committee of the N. M. T. A., consisting of M. H. Barker, president of the association; C. Bermingham, of the Canadian Locomotive Works, Kingston, Ont.; P. B. Kendig, of the Seneca Falls Mfg. Co., Seneca Falls, New York; H. P. Eells, of the Bucyrus Co., Milwauke, Wis., and Robert Wuest, acting commissioner, held its initial monthly meeting at the Iroquois Hotel at Buffalo, N. Y., on April 12 and 13. The affairs of the association were gone over and matters that came up during the month were discussed. It was the concensus of opinion that these monthly meetings of the committee would be of great value and will prove of advantage. The time and place for the next meeting has not been decided upon.

The strike of the boiler makers in the employ of the New York Central Iron Works at Geneva, N. Y., according to last report can be called a closed incident, the places vacated by strikers having been filled.

PREPARING TO ENTERTAIN.

The local contingent of the National Supply & Machinery Dealers' Association at Cincinnati is making arrangements for the entertainment of the delegates to the big convention of the A. S. & M. M. A., and the S. S. & M. D. A. with N. S. & M. D. A., to be held in that city on May 8, 9, and 10. The Cincinnati entertainment committee, consisting of George Puchta, Samuel L. Moyer, C. E. McFarlan, and S. D. Baldwin, held a meeting on April 18, and made up a program of entertainment. It was decided that wives and other women relatives accompanying members shall be invited to the banquet at the Sinton the second evening of the meeting.

On Wednesday evening, May 8, the same rule will be followed of inviting the ladies, and all will join in a trip up and down the river on the Island Queen, with music, dancing and refreshments.

Wednesday and Thursday afternoons, while the men are discussing trade affairs, there will be theater parties and special trolley car rides for the women visitors.

Purchase Furnace. — Berry Bros., Ltd., of Detroit, have purchased the plant of the Elk Rapids Iron & Chemical Co., at Elk Rapids, Mich., consisting of a blast furnace, chemical works for the manufacture of wood alcohol and acetate of lime and 51 charcoal kilns.

FIVE DOLLARS PER DAY

Will be Demanded by Structural Iron Workers at Chicago.—Labor News.

A new scale of wages, involving an increase of 20 cents a day, has been demanded by the structural iron workers in Chicago, as a basis for an agreement between the union and employers, May 1. The present wage of $4.80 for a day of eight hours was granted last spring as a compromise settlement, between the demand for $5 a day and the scale then being paid. The present demand will be resisted by all the local members of the National Erectors' Association, who are seeking to establish a uniform scale for the entire country.

Demand Shorter Hours.

It is announced by the National Founders' Association that according to information received from the Pacific coast the local molders' union in that section will demand of the foundrymen this spring that they recognize the eight-hour day instead of the nine-hour now in effect. The national molders' union has been requested to assist its members on the coast in obtaining the concession.

Labor Notes.

The molders in the employ of the Great Western Stove Co., Lebanon, Kas., have received an increase of five cents per day. Other employes of the foundry will also be raised, but the amount of the increase has not yet been determined.

One-half of the molding force of the Herendeen Mfg. Co., Geneva, N. Y., walked out April 9 because the company was doing some work for the New York Central Iron Works against which a strike for higher wages was declared March 1. The Herendeen company's plant has been an open shop.

Moorehead Bros. and Spang, Chalfant & Co., Inc., both of Sharpsburg, Pa., have posted notices informing their puddlers of a new scale of wages which grants increases from 50 to 75 cents a ton. The new scale for Moorehead Bros. will be $5.75, superseding the old rate of $5 per ton, and that of Spang, Chalfant & Co., Inc., $5.75 per ton, against the old price of $5.25.

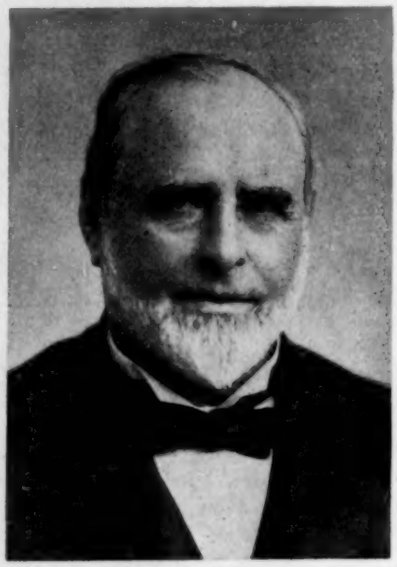
In the injunction suit of the Pope Motor Car Co. against the machinists' union, at Indianapolis, the court has directed the U. S. marshal that if the union fails to pay the court costs, amounting to $800, to sell about $3,000 worth of property, real and personal, owned by several union machinists, which has already been levied upon.

DEATH OF C. M. FARRAR.

Chillion M. Farrar, an inventor and ironmaster of Buffalo, died April 17, at his home in that city, at the age of 77.

Mr. Farrar was born in Detroit, in 1829, and before attaining his majority, he went to Buffalo and learned the molder's trade. Later he became superintendent of the Tifft Iron Works, and there formed a close friendship with the late John Trefts, the foreman of the same works. They later took in a third partner and started a foundry in 1866, manufacturing tug and marine engines.

Mr. Farrar's genius showed itself in the invention of several notable improvements on the steam engine. Numbered among these, were the hog-trough frame, steel cross-head and the palm link. The success of the Farrar engine was demonstrated about the time when the rush began into the Pennsylvania oil fields.



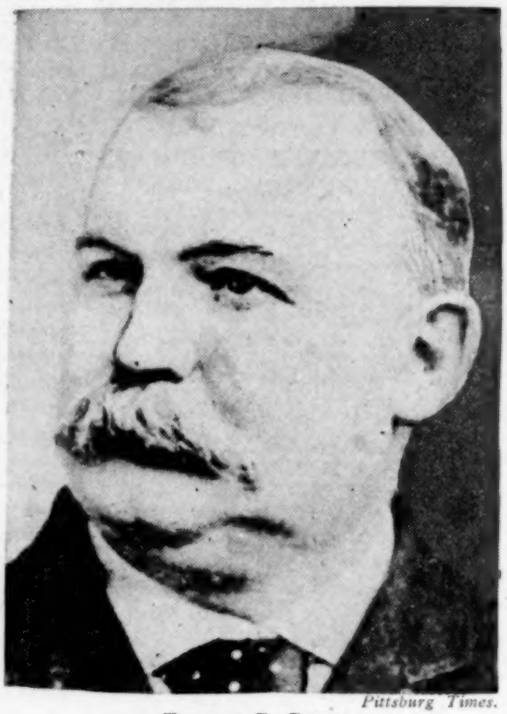
CHILLION M. FARRAR.

The concern has had a prosperous existence and the plant has undergone repeated extensions to keep pace with the business. Mr. Farrar is survived by a widow and one daughter.

John T. Frawley, secretary and treasurer of the Tod-Stambaugh Co., Cleveland, iron ore dealer, died Wednesday, April 17, from pneumonia, aged 61. Early in his business career, Mr. Frawley became identified with the iron ore business and for 39 years was with the Tod-Stambaugh Co. He was well-known in the iron ore and vessel interests in Cleveland, and was an intimate friend and associate of the late John Tod.

DEATH OF THOMAS B. RITER.

Thomas B. Riter, president of the Riter-Conley Mfg. Co., and a well known figure in Pittsburg's industrial world, died in that city April 23, after a lingering illness. Through his indomitable energy and enthusiasm for business detail Mr. Riter was enabled to build up a business that extended to all parts of the world and brought great renown in the manufacturing field to himself and to his community. Born in York, Pa., in 1840, he assumed the sober cares of business life at an early age, entering the employ of Marshall Bros., Pittsburg, elevator manufacturers. In 1858 the late James M. Riter, his brother, founded a steel construction shop, which was the nucleus of the present immense plant. Thomas went to work in the plant, beginning as a blacksmith, but soon by his aptitude for the work he was elevated to the foremanship. In the later 60's, when the Pennsylvania oil fields assumed immense proportions the firm launched into the tank building business and enjoyed a practical monopoly of that class of steel construction. The younger brother, in addition to his duties as foreman, busied himself by traversing the then rough and unsettled oil districts in the pursuit of new orders. These trips were very arduous and often he was obliged to ride horse-back over rough roads from early morn until late at night marking the location of tanks which he was commissioned to erect. In this work he formed the intimate friendship of H. H. Rodgers and the late Daniel O'Day, well known Standard Oil officials. Upon the tragic death of James Riter in a railroad wreck in 1873, the younger brother and the late W. H. Conley, the firm's bookkeeper, purchased the plant and formed the firm of Riter & Conley. The business was then extended to the construction of blast furnaces in which the company soon became a conspicuous factor. In 1898 Mr. Conley died and Mr. Riter incorporated the Riter-Conley Co., with a capital of $900,000, becoming president and taking into partnership with him several of his younger employes who had particularly distinguished themselves in their several departments. Under Mr. Riter's supervision the company expanded until its business extended to all parts of the world. It built many of the large blast furnaces in the country, among them being those operated by the Carnegie Steel Co. and the Jones & Laughlin Steel Co., including the Eliza and the Soho groups. The four big blast furnaces and the open-hearth steel plant of the Dominion Iron & Steel Co., at Sydney, N. S., were erected by the company. At present the concern is engaged in the construction of the great blast furnaces of the United States Steel Corporation at Gary, Ind. In the Texas oil field the company has taken many large contracts, some of the tanks erected having capacities that had never before been heard of. At all times Mr. Riter was a thoroughly practical business man and he took keen pleasure in his work, declining to seek the pleasure from sports and amusements with other wealthy men of his class. He is survived by a wife and one son, Joseph, aged 23.



Pittsburg Times.

THOMAS B. RITER.

Thomas Venner, once an associate of Henry Bessemer, and himself a well known iron master in England and American, died April 18 at the home of his daughter, in Brooklyn, after a short illness. He was born near Birmingham, England, July 31, 1823, and chose the iron business as his life's pursuit in his early youth. Later he became superintendent of the Round Oak Iron Works, Staffordshire, owned by the Earl of Dudley. In 1869 he went to Portsmouth, O., to erect a mill and later took charge of the works of the Baltimore & Ohio railroad at Cumberland, Md. In 1875 he became manager of the Keystone mill at Pittsburg, remaining there until 1892, when he retired from active business.

TREMENDOUS DEMANDS FOR RAILROAD SERVICE

DUE TO THE UNPRECEDENTED PROSPERITY OF THE COUNTRY

Described by Vice President Brown of the New York Central at a Notable Buffalo Banquet.—Heavy Requirements to Keep Pace With Progress.

Buffalo, April 19.—Six hundred prominent men of the manufacturing and commercial world of Buffalo and western New York, with high state officials and the vice presidents of railroads banqueted at the Ellicott Club in this city Thursday evening, April 18, to celebrate the fiftieth anniversary of the inception of the Buffalo Chamber of Commerce and the completion and dedication of its new home, an imposing thirteen-story building at Main and West Seneca streets. The banquet is acknowledged to have been the most important event of its kind ever held in Buffalo. It overflowed the largest banquet hall in the city, and scores were unable to secure seats. The assemblage had a significance of decided importance to the city of Buffalo and the Niagara Frontier though it outwardly appeared to be a grand celebration. It plainly demonstrated that the commercial interests of Buffalo are awake to the epoch of development and progress into which Buffalo and the Frontier is entering. In all the speeches this idea was conveyed to the banqueters and all went away with a better understanding of what the Chamber of Commerce stands for and also a conception of the real advantages Buffalo holds out to industry.

The Chamber of Commerce asks its legion of members to boost Buffalo, to herald her geographical features, her railroad and marine facilities and the benefits to be derived from the electric power now brought here from Niagara Falls. All were urged to beckon to manufacturers and hold out a welcoming hand to new enterprises, of which there are many locating here. These expressions were approved by howls of applause from the members of the Chamber of Commerce.

Distinguished Guests.

Numbered among the guests gathered at the speaker's table were the following: William H. Gratwick, president of the Chamber of Commerce; the Hon. Charles E. Hughes, governor of New York; the Hon. J. N. Adams, mayor of Buffalo; John N. Scatcherd, Henry J. Pierce, president of the International Railway Co.; Frederick D. Underwood, president Erie railroad; William C. Brown, senior vice president New York Central lines; Charles F. Daly, vice president New York Central lines; R. C. Steele, president Toronto Board of Trade; George G. Yeomans, Wabash railroad; Arthur G. Yates, president Buffalo, Rochester & Pittsburg railroad; John H. Baker, chairman, membership committee; C. Hallam Keep, superintendent of banks; E. H. Butler, William J. Conners, George E. Matthews, Carlton Sprague, W. Caryl Ely, William H. Andrews, vice president Chamber of Commerce; Hugh Kennedy, Buffalo & Susquehanna Iron Co., and the Seneca Iron & Steel Co.; John B. Thayer Jr., vice president Pennsylvania railroad; Richard L. O'Donnel, superintendent Pennsylvania railroad; B. D. Caldwell, vice president and general manager Delaware, Lackawanna & Western railroad; Thomas N. Jarvis, vice president Lehigh Valley railroad; Michael Doyle, president Rochester Chamber of Commerce; William A. Joyce, Col. Thomas W. Symons, the Hon. D. S. Alexander, the Hon. William H. Ryan, William A. Rogers, Rogers, Brown & Co.; Charles W. Goodyear, vice president Buffalo & Susquehanna railroad; George P. Sawyer.

Vice President Brown's Address.

Besides Gov. Hughes, the guest of honor and principal speaker, were other speakers of note, including Mayor J. N. Adams, W. Caryl Ely, former president of the International Railway Co., and now interested in the Niagara Falls power projects; Henry J. Pierce, president of the International Railway Co., W. C. Brown, senior vice president of the New York Central Railroad; John B. Thayer Jr., vice president of Pennsylvania lines, and Fred D. Underwood, president of the Erie Railroad. To the iron and steel interests the speech of Mr. Brown of the New York Central, had a special interest. This railroad official spoke at length on the railroad situation of the country and fortified his statements with statistics corrected to the day of his speech. These excerpts from his address are of interest:

In the month of March the New York Central proper handled 602,898 loaded cars, which was the heaviest movement of any month in the history of the road, and exceeded the movement of March, 1906, by more than 50,000 loads.

Up to and including the 17th, the loaded cars handled by the New York Central this month shows an increase over the same period of April, 1906, of more than 84,000.

Notwithstanding the fact that the New York Central lines and almost all other railroads in the country are moving a vastly greater tonnage than ever before in their history, there never was a time since railroads have existed, or before, when there was as much freight waiting transportation, and almost valueless without transportation, as there is today.

The reason for this condition is the tremendous commercial activity of the past three years could not have been foreseen. It came as a surprise to the farmer, the merchant, the manufacturer and the railroads; and, added to the physical impossibility of providing adequate transportation facilities in so short a time for this sudden and tremendous increase in business, was the fact that almost every other avenue of investment offered a higher as well as more certain return than could be hoped for from money invested in railroads.

With the exception of the railroads in the extreme north and northwest, where climatic conditions have limited their ability to handle business, freight has been handled in larger volumes than ever in the history of the roads; and, notwithstanding this fact, great manufacturing concerns all over the country have been embarrassed by the inability of the railroads to furnish fuel and raw material on the one hand; and their loading platforms have been filled with finished product that has been sold and the delivery of which is urgently demanded by consignees, but which the railroads have been unable to handle.

Further, and more serious than this is the fact that the elevators in Chicago and all the great trade centers of the west, and local elevators throughout the great grain-growing states, are filled with grain of last year's crop, which, unless moved within a very short time, on account of climatic conditions, will be very greatly impaired in value.

The shortage of cars for export freight is not confined to grain or its products. Through the month of January and a large part of February, the International Harvester Co. was short 200 cars for export loading. The same condition applied to factory, farm, and mine and to every state in the union.

It is not entirely a question of cars and engines. If the roads could at once provide themselves with ample power and freight equipment they would be immediately confronted by the inability to move the freight over their roads or to handle it at seaboard terminals.

Real estate in New York, Boston, Philadelphia, Baltimore and other Atlantic port terminals costs almost as much per square foot at the present time as it did per acre at the time the original terminal facilities were provided, and adequate facilities can only be provided by the expenditure of millions of new money.

In every great manufacturing center vast additions are being made to manufacturing plants. At the south end of

Lake Michigan more than $100,000,000 is being spent this year in erecting great steel plants, rolling mills, car manufactories, etc., all of which will add to the already tremendous freight tonnage which the past year has demonstrated beyond any question of doubt the present railroad facilities are utterly inadequate to handle.

So far as the lines of the New York Central are concerned, the inability to handle current traffic is not due to negligence in at least attempting to provide itself with necessary power and equipment.

Since Jan. 1, 1901, and including equipment now under contract and being delivered, our motive power has been increased from 3,156 locomotives to 5,229 locomotives, or 67 per cent. During the same period our freight car equipment has increased from 127,563 cars to 196,724, or 54 per cent, involving an expenditure of about $110,000,000. These figures do not adequately express the increase, as the added engines and cars are of very much higher capacity than those they displaced.

During the latter part of 1906 and the first quarter of the present year the expenses of the railroads of the United States have been increased from $90,000,000 to $100,000,000 annually in increases in wages of employes. A still further and material increase will be effected when the recent enacted law restricting the hours of labor of a large number of railroad employes becomes effective. In many states a reduction in rates of passenger fares, amounting to 33 1-3 per cent of the legal rate which such roads are permitted to charge has been made. In other states sweeping reductions in freight rates are being considered. Reduction in compensation paid railroads for transportation of mail, amounting to from $10,000,000 to $12,000,000 annually was made by the last congress.

These conditions which confront railroads are enough seriously to check the investment of money in new roads or in the great improvements in existing roads that must be made with the least possible delay unless the development of the resources of the country, and the extension of its trade, both domestic and foreign, is to receive a very serious check; but worse, perhaps, than its effect on the actual conditions referred to is the fact that out of a wise and timely effort of the president to correct grave evils and abuses, has grown a storm of extreme hostility and indiscriminate agitation against railroads, which has resulted in the enactment of much unjust and hurtful legislation in many states, and which has almost destroyed the credit of the railroads, both at home and abroad.

If the development and extension of the nation is to go on, if the progress made during the last ten years may be accepted as in any respect a measure of progres to be made during the coming decade ,almost as much money will have to be expended in increasing the facilities of existing railroads and in building additional railroads as has been expended during the 80 years since the beginning of the construction of railroads in the United States.

Unless assurance can be had—not of condoning wrongdoing, or winking at abuses—but of friendly co-operation, of protection and aid in every fair and legitimate manner against oppression and injustice; of such guarantee as the government can give of protection from legislation which will prevent earning a reasonable return on money invested, and a fair participation in increased values and general prosperity which investments of this character aid in promoting, it is going to be impossible for the railroads to obtain the money necessary for such improvements and extensions.

Hundreds of millions of dollars worth of necessary improvements have been stopped, and will not be undertaken until a restoration of confidence can be had, which will make it possible to float large issues of railroad securities, both at home and abroad. For the purpose of securing this necessary restoration of confidence, it seems to me the great business interests of the country should unite with the railroads in an appeal for a cessation of agitation looking to the enactment of future restrictive legislation until these great interests, mutually interested as they are in the prosperity and development of the resources of the nation, can adjust themselves to these new conditions.

Never in the history of the country have laws of such great importance affecting any one industry become effective as those relating to railroads which were enacted by the last congress and its immediate predecessor.

I hope and firmly believe that such legislation as has become effective will result in good, both to the public served by the railroads and to the railroads. I believe the railroads of the country as a whole have accepted this legislation in good faith, and desire its strict and impartial enforcement.

I am firmly and unalterably in favor of the regulation of railroads and all other corporations by the nation and the states—the people created these corporations and have the undoubted right to regulate them.

Railroad Notes.

The American Car & Foundry Co. has received an order for 1,000 box cars and 750 gondola cars for the Mobile & Ohio Railroad Co. The Sierra Madre Land & Lumber Co. has contracted for 150 box cars with the Pullman Co.

The Seaboard Air Line railway will erect new shop buildings at Jacksonville, Fla., as follows: Machine and erecting shop, 117 x 380 feet; rod and tender shop, 66 x 260 feet, with extension 60 x 66 feet; tin and smith shop, 61 x 181 feet; passenger car shop, 90 x 300 feet; car wheel, axle and smith shop, 28 x 150 feet; boiler and engine room, 63 x 122 feet, and planing mill, 50 x 176 feet. W. A. Garrett, of Norfolk, Va., is general manager.

The Baltimore & Ohio railroad will erect large car shops at Fairmont, W. Va., in which equipment used on the Wheeling, Monongah and Pittsburg divisions will be remodeled and repaired. Plans had been made to build these shops in Grafton but further consideration led to the decision to place them at Fairmont.

FOUNDRY TOPICS

Which Will be Considered at the Philadelphia Convention of the A. F. A.

Although the program of the proceedings of the convention of the American Foundrymen's Association has not been definitely adopted, it has been decided to open the exhibit in the Second Regiment armory on the morning of May 20, when registration will begin. The opening session of the meeting will be held on Tuesday morning, and the address of welcome will be made by the mayor of Philadelphia. Reports of the president, secretary and committees will also be submitted. Papers will be read during the afternoon session, while the evening has been left open for individual or official entertainment. On Wednesday morning, matters of interest to the brass trade will be discussed and the organization of a Brass Founders' Association will be effected. Papers illustrated with lantern slides will be presented in the afternoon and a smoker will be given by the Philadelphia association in the evening. A river trip and shad dinner has been arranged for Thursday, with visits to the Wm. Cramp & Sons' Ship & Engine Building Co., and other ship yards. The closing session will be held on the return trip or immediately thereafter. Arrangements have been made for a trip to the Baldwin Locomotive Works and other large plants on Friday.

Among the papers promised are the following subjects: Cupola practice, mixers in the foundry, cost accounting, industrial betterment, technical schools in the foundry, pattern notes, foundry construction and lay out, core room practice, gray iron, steel foundry as a business venture, blast furnace practice, malleable iron, cast thread fittings, skilled labor supply for foundries, dry galvanizing, electric smelting for the foundry and brass and metallurgical problems.

Tool Builders to Meet.—The semi-annual convention of the National Machine Tool Builders' Association will be held at Fortress Monroe, Va., Tuesday and Wednesday, May 14 and 15, with the hotel Chamberlain as headquarters. A number of important subjects are listed for discussion. A strong effort is being made to increase the membership of the association. An invitation has been extended to those manufacturers of machine tools who have not affiliated with the organization to be present at the sessions and meet their fellow manufacturers.

NEW WEST STREET BUILDING

Will be Headquarters for Heavy Machinery Companies.—Penton Publishing Co.'s Offices.

The machinery, engineering and supply trade of New York City, after months of wandering because of extensive building operations in the district formerly occupied, is now re-locating itself with the new West Street building, corner Cedar and West streets, as its center. The finishing touches are just now being placed on

THE WEST STREET BUILDING.

this building, which is pronounced to be architecturally the most beautiful office structure in the world, and it is being rapidly occupied by tenants, as practically all its space has been engaged. The building is twenty-four stories in height, has the best of light and air on all sides, is very convenient to the subway, both elevated lines, the New Jersey ferries and the new tunnels to Jersey City and commands a splendid view of the busy North river. The offices of the Penton Publishing Co., have been moved from 150 Nassau street to the West Street building.

The following list includes a part of those concerns which have already secured space in the building:

Penton Publishing Co., publisher of THE IRON TRADE REVIEW, *The Foundry, the Marine Review*, and *Boating*.
George V. Cresson Co., machinery.
Goldschmidt Thermit Co., steel welding.
M. H. Treadwell & Co., engineers.
Thomas W. Pangborn Co., foundry equipment and supplies.
American Wood-Working Machinery Co., machinery.
Scranton Bolt & Nut Co.
Wickes Bros., machinery.
American Diamond Rock Drill Co.
Quincy, Manchester, Sargent Co., machinery.
Rossiter, McGovern & Co., machinery.
Reading Steel Casting Co.
W. D. Sargent.
International Brake Shoe Co.
Wheeler Condenser & Engineering Co.
Green Fuel Economizer Co.
Sarco Fuel Economizer Co.
Henry A. Hitner's Sons Co., iron and steel.
Parker Boiler Co.
A. H. Schutte, machinery.
Standard Railway Equipment Co.
National Railway Materials Co.
L. J. Wing Mfg. Co., machinery.
Goubert Mfg. Co., steam specialties.
Bird-Archer Co., boiler compounds.
McClave, Rimmer & Co., machinery.
National Metal Co.
John Pierce Co., contractor.
DuPont Powder Co.
New York Steam Co.
John B. McDonald, contractor.
A. D. Granger Co., engineering.
T. A. Gillespie Co., engineering.
Pierce Well Engineering & Supply Co.
Pelton Water Wheel Co.
Neptune Meter Co.
Karl Vesterdahl & Co., engineering.
Laflin, Rand Power Co.
C. Von Goeben & Engel, engineering.
W. W. Tupper & Co., grate bars.
H. Sanders, engineering.
James B. Tonkin, consulting engineer.
Enholm, Crosland Co.
John A. Caldwell, engineering.
Bacon Air Lift Co.
Walter Kidde, engineering.
Keystone Equipment Co.
Leber & Sons, machinery.
Hill, Clarke & Co.

QUARTERLY DIVIDEND PASSED.

The directors of the Bethlehem Steel Corporation at a recent meeting determined to pass the usual quarterly dividend of three-fourths of one per cent on the preferred stock. President Charles M. Schwab, of the corporation, speaking upon this subject, is quoted as saying:

Not until the Bethlehem Steel Corporation is a commercial proposition and not dependent upon government work for its existence will I favor the resumption of dividends upon the preferred stock.

Since we began our extensions in commercial steel, we have spent millions of dollars. I think the total expenditure for these purposes will be found to reach $17,000,000 before the close of this year. Our new plants will be in operation in the fall of this year, and naturally we look for pronounced improvement in the company's earnings as soon as these plants are turning out structural material and rails.

At the annual meeting of the Bethlehem Steel Co., Charles M. Schwab, Max Pam, J. E. Schwab, Archibald Johnston, H. S. Snyder, B. H. Jones, James E. Kernan and Eugene G. Grace were chosen directors. The following officers were elected: Archibald Johnston, president; H. S. Snyder, vice president; B. H. Jones, secretary and treasurer.

Get Furnace Contract.—Jepson, Mason & Co., Buffalo, N. Y., who recently completed the brick work on the new blast furnace plant of the Toledo Furnace Co., Toledo, O., have taken the contract for all the brick work on the new blast furnace plant of the Hamilton Steel & Iron Co., Hamilton, Ont. The company also

BROKEN RAILS

Being Investigated by Canadian Officials.—News of the Dominion.

Toronto, Canada, April 20.—The Dominion Bridge Co. has taken over the bridge and structural department of the Locomotive & Machine Co. at Montreal, leasing the ground occupied by the bridge and structural works, which covers an area of nine acres, and acquiring the entire plant.

The Canadian railway commission has ordered a thorough investigation into the causes of the numerous railway accidents due to broken rails. T. L. Simmons, assistant chief engineer of the commission, has returned from an inspection of the roadbed and rails of the Canadian Pacific Railway at Chapleau, the scene of the late fatal accident, and reported the roadbed to be in good condition and the accident due to the breaking of a rail from a cause yet to be determined. The rail was of American make and had been in use nine years. At the Guelph accident in February, the broken rail was of English manufacture and had been down 19 years. So far no particular defect has been noted in Canadian rails. At a meeting of the Engineers' Association in Montreal last week, the question as to the causes of frequent rail breakage was discussed, and specialists urged a return to the open hearth system of making rails in place of the Bessemer. A full report on the subject will be made when the investigations are completed.

The monthly report of the Canadian department of trade and commerce for December last, just issued, shows total imports into Canada of iron and steel and their manufactures of the value of $2,910,497, of which $2,355,399 came from the United States, as against total imports of $2,870,422 and American imports of $2,428,720 during December, 1905.

The Brockville Malleable Iron Co., Ltd., of Brockville, Ont., has been incorporated with a capital of $60,000 and a board of provisional directors comprising John Connolly, Geo. I. Mallory, John A. MacKenzie, Chauncey H. Greaves, Wm. H. Harrison and H. A. Clark.

Trade is Prosperous.—At the monthly meeting of the nut and bolt manufacturers, held April 17, a very cheerful sentiment in regard to the future prospects for business was shown, and none of those present reported a diminution in trade. Similar prosperous conditions were also shown at the monthly meeting of the Eastern Iron Bar Association.

PERSONALS.

John A. Hill, president of the Hill Publishing Co., New York, is in Europe.

W. T. Bussey, president of the Chicago Stove Works, has been elected president of the Illinois club of that city.

S. G. Valentine, superintendent of the Dunbar Furnace Co., has resigned. He has had charge of the furnace for 10 years.

W. G. Williams has resigned as president and general manager of the Wilmington Iron Co., Wilmington, Del., and has been succeeded by J. Hempstead.

Robert Aiken, of Toledo, has been appointed general superintendent of the Lloyd-Booth foundry of the United Engineering & Foundry Co., Youngstown, O.

S. M. Wetmore has been appointed general superintendent of the Carbon Steel Co. at Pittsburg and J. T. Rowley has been made superintendent of the mills.

P. D. Mackay, formerly connected with the steel works at Pueblo, Colo., has resigned to become general manager of the Western Iron & Steel Co., at Denver.

W. H. Hoagland, general superintendent at the plant of the Findlay Axe & Tool Co., Findlay, O., has resigned to accept a position with another concern.

F. A. Winans, formerly sales agent of the Flushing Coal Co., Elyria, O., has become sales agent in charge of the coal department of the Iron City Coal & Coke Co., Pittsburg.

William Boger, formerly with the West End Rolling Mills, Lebanon, Pa., has been appointed assistant general manager of the Duncannon Iron Co.'s plant, at Duncannon, Perry county, Pa.

Richard Peters Jr., until recently connected with the Rising Fawn Furnace, Rising Fawn, Ga., has accepted a position as assistant treasurer and purchasing agent with the Birmingham Iron Co., Birmingham, Ala.

F. H. Daniels, chief engineer of the American Steel & Wire Co., after making an extensive tour of industrial plants in Europe inspecting recent improvements made, has returned to this country.

Ralph Templeton, formerly with the Whitman, Barnes Mfg. Co., has been appointed the New York representative of the Pittsburg Vise & Tool Co., Pittsburg, Pa. Mr. Templeton's office will be at 97 Warren street.

A. S. Blagden has resigned as superintendent of the National Steel Foundry Co., New Haven, Conn., to accept a more lucrative position with another steel company. Mr. Blagden was presented with a number of handsome cut glass gifts by his former employes.

Alexander Yule, secretary of the De Camp Brothers & Yule Iron, Coal & Coke Co., St. Louis, is about to leave for a short pleasure trip through Europe. While abroad Mr. Yule plans to pay a visit to a number of iron and steel works in England, Scotland and Wales.

D. C. Beaman has been chosen vice president of the Colorado Fuel & Iron Co. to succeed Jesse F. Welborn, who became president on the death of Frank J. Hearne. Mr. Beaman has served in the legal department of the company practically ever since it was organized.

A. J. Boyle, who for a number of years held positions in the Edgar Thomson works of the Carnegie Steel Co., Braddock, Pa., has severed his connection with that plant. Mr. Boyle has been connected with the works for 18 years, of late having been its night superintendent.

Frank Walker has resigned as superintendent of the converting mill of the South works of the Illinois Steel Co., Chicago, Ill., to become assistant to Peter Gordon, general superintendent of the Bessemer works and Brown-Bonnell plant of the Republic Iron & Steel Co., Youngstown, O.

M. E. Wallace, superintendent of the Westinghouse Air Brake Co.'s plant at Wilmerding, Pa., has taken charge of the Westinghouse plant at Hamilton, Ont., where the air brake company and the electric company have been merged. O. E. Buenting has succeeded Mr. Wallace as superintendent of the Wilmerding plant.

Charles J. Goebringer, formerly foreman in the brass foundry of the American Valve & Metal Co., Cincinnati, has been made western representative, with headquarters at Philadelphia, of the Foundry Specialty Co., Cincinnati, manufacturer of partine and fluxine. This company reports a large increase in the demand for its brass foundry specialties.

Arthur H. Buhl, son of the late Theodore D. Buhl, has been elected president of the Buhl Malleable Co., Detroit, in place of his deceased father. Willis E. Buhl, another son, has become president of the Buhl Sons' Co., and will also be a director of the Buhl Malleable Co. Arthur H. Buhl has been made vice president and general manager of the Buhl Sons' Co., and Leon Smith has been elected as a member of the board of directors of that concern.

P. J. Moran, superintendent of the Youngstown furnace of the Republic Iron & Steel Co., has resigned to become general superintendent of the furnaces of the United Iron & Steel Co. William Fair has been made superintendent of the Haselton furnaces and George Shook superintendent of the Hannah stack at the valley works.

E. P. Leadbetter has been appointed manager of the Pittsburg office of the Buffalo Forge Co., succeeding C. I. Dean, who has gone into mining operations in Mexico. For the past three years Mr. Leadbetter has been connected with the Philadelphia office of that company and previous to that time was located at its factory office in Buffalo, N. Y.

H. S. Norton, who recently resigned his position as secretary to the superintendent of the Illinois Steel Co.'s plant, Joliet, Ill., to take charge of the Gary Land Co., was the guest of honor at a farewell banquet given in that city April 2. Superintendent D. R. Mathias was toastmaster and Mr. Norton was presented with a diamond ring by his official associates.

J. W. Van Meter has disposed of his interest in the Mitchell & Van Meter Co., Linfield, Pa., and resigned his position as secretary and treasurer of the company. Mr. Van Meter has organized the Van Meter Foundry Co., and has been elected its president and treasurer. The company has secured a foundry property at Eighth and Chestnut streets, Reading, Pa., and will manufacure a general line of plumbers' iron goods, etc.

The appointment of George Otis Smith as director of the United States geological survey to succeed Charles D. Walcott, recently named as secretary of the Smithsonian institution, has been announced. Mr. Smith's connection with the survey office extended over ten years, and his ability as a field worker in addition to that in the executive capacity has been generally recognized.

F. F. Prentiss and J. D. Cox, president and vice president respectively of the Cleveland Twist Drill Co., have sailed for a three months' trip through Europe on pleasure and business combined. Messrs. Prentiss and Cox will devote the first six weeks of their trip abroad visiting the company's various agents in different parts of Europe. The remainder of the sojourn will be spent in a pleasure tour of points of interest in England, Scotland, Ireland and Wales.

WORDS OF WISDOM AND ELOQUENCE

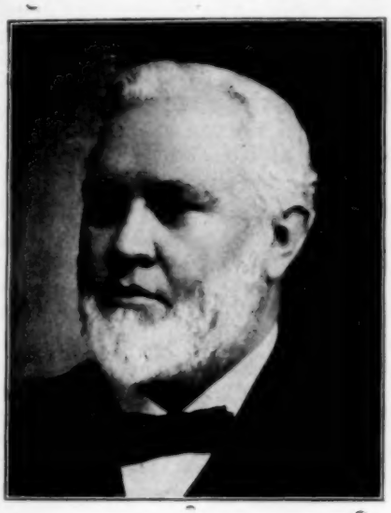
SPOKEN AT THE DEDICATION OF THE ENGINEERING SOCIETIES BUILDING

Chas. F. Scott Tells of the Conception and Carrying Out of the Plan.—President Hadley Speaks of Professional Ideals of the Twentieth Century.—Other Addresses.

The exercises attending the dedication of the Engineering Societies' building in New York on April 16 and 17, were briefly reviewed in THE IRON TRADE REVIEW last week, a synopsis of the Tuesday proceedings being given including President Roosevelt's message and Andrew Carnegie's address.

Tuesday's Exercises.

After a musical selection by the Richard Arnold double quartette, the exercises were opened by Charles Wallace Hunt, ex-president of the American Society of Mechanical Engineers. Following a prayer by the Rev. Edward Everett Hale, chaplain of the United States senate, greetings were read from the president of the United States, the president of the republic of Mexico and also the governor-general of Canada. Mr. Hunt in presenting Charles F. Scott told of Mr. Scott's ambition for a union engineering building to house all the great societies centered in New York. Mr. Scott's historical address follows:



CHARLES WALLACE HUNT.
Ex-President A. S. M. E., and Chairman of Dedication Exercises.

Mr. Scott's Address.

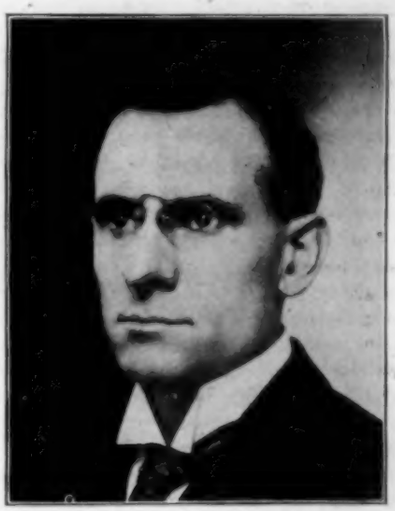
The realization of the ideals of many years and the definite beginning of the building which we today dedicate dates back four years. On Feb. 10, 1903, Mr. Carnegie talked over the project with the two gentlemen whom he had invited to his house. As the general scheme seemed feasible, he said that he was ready to provide the funds for a building if a practicable plan could be presented. An hour later, a meeting of engineers had been arranged for the following day. The scheme was discussed; plans were formulated, and a few days later John Fritz, John C. Kafer, William A. Redding, Calvin W. Rice, Chas. F. Scott and John Thomson discussed the matter freely with Mr. Carnegie. To these gentlemen, on St. Valentine's day in the late afternoon, he said the magic word which transformed long-cherished dreams and new-found hopes into a reality.

And here about us is the culmination—the work of committee and architects and builders. The building stands as its own record of what has been done. The result is simple and easily seen; yet, it embodies the solution of many problems. At first it seemed that so much was achieved when the funds were provided that little remained to be done. But much has intervened between the making of the gift and completing of the building. In designing the building we had no precedent to follow, for never before had engineering found so generous a patron. Engineering societies themselves belong to the new order of things. The oldest of the participating societies numbered little more than three decades. In the past, these societies were well-nigh strangers to one another. Now to utilize this gift they must plan and work together. The gift, moreover, had a unique feature in being presented in common to professional societies, whose interests are technical, and to the Engineers Club, which is social.

At the beginning there were broad questions of general policy to be determined. There must be a basis of relationship between the professional societies, and then one between the societies and the social club. As the outcome of this first step, three members from each of three societies, and three from the club, were appointed as a conference committee of twelve members. Through its two sub-committees, the two buildings with convenient inter-communication, have been erected on land acquired respectively by the societies, acting through the United Engineering Society, and by the club.

Planning the Building.

The building for the engineering societies required first of all to be planned in imagination. What were the immediate needs of our three societies? How many associate societies would join us, and what were their needs? What should be the size and number of assembly halls: the provision for offices, for board rooms, and reception rooms and library? Even though we gaged the present accurately, how should we estimate the future needs? What of the future growth? So rapid is the present growth that the aggregate membership of the three founder societies has increased 53 per cent since the gift was made. New engineering societies are forming.



CHARLES F. SCOTT.
Chairman Conference and Building Committees.

It would be interesting to relate, if time permitted, how our ideas developed, so that a million dollars was too little, and Mr. Carnegie graciously made his letter read "say, a million and a half;" how are ideas crystallized into a program to be followed by competing architects; how we selected from twenty-six sets of plans the one which all agreed was best; how we studied the details of arrangement and the selection of materials to secure flexibil-

ity in the functions of the various parts of the building, and insure a wise expenditure of the funds entrusted to us; and how efficiently architects and builders have done their part.

We recognize that an underlying purpose of Mr. Carnegie was to develop the human as well as the technical side of the engineering profession. He said to us that co-operation is "the keynote of success" and that there is "a harmonizing feature which counts for everything in the progress of any great movement, political, social, or scientific." Hence he associated together the club and the societies in order, as he expressed it, "to combine the social with the scientific."

The same idea has guided the arrangements of the societies' building. It is seen in the reception rooms of the societies, in the spacious entrance hall, in the corridors about the auditorium, in the arrangement of the smaller halls, by which the one used as a lecture room may have an adjoining one as reception room, and in the provision for serving light refreshments, which add zest to the social after-meeting.

And then, in a sense, the crowning feature of the whole project, as it is of the building itself, is the library. In the magnificent spaces which are above us there lies a great possibility. The libraries of the three societies are the nucleus, the foundation, for a great engineering library, a depository for archives, a record of experience and achievement, a storehouse of intellectual power of countless value and far-reaching influence. In the future it may be embellished and dignified by memorials of those who have contributed to the engineering progress of the world. And, in this library, the past officers of the societies have already placed a bronze bust of the donor as a perpetual recognition of the great gift of this building.

Power-Generation and Economics.

And this building—simple, dignified and appropriate to its intended uses—is to be the home of the engineering societies.

These societies are the expression of engineering forces, and engineering forces are fundamental to the achievements of our age.

Underlying the tremendous economic changes of the present time is the power-generating steam engine. Driving the locomotive, it has transformed innumerable provincial towns into one great community, and many independent states into one nation. Driving the factory, it has developed manufacturing and industry on a scale undreamed-of a century ago, and scarcely comprehended now. Driving the ocean vessel, it is rapidly making the whole world kin.

Its influence transforms and vitilizes. The present production of wealth, the new functions of capital and labor, the modern business corporation, the occupations and social relations of men, the growing brotherhood which portends a universal peace—all have followed the engine of Watt, all belong to the New Epoch, the epoch of manufactured power.

The whole fabric of our daily life is based upon the modern methods of utilizing the materials and forces of nature; it is reared upon foundations laid by the engineer; it daily depends upon the operations which he controls. He has been the harbinger of prosperity and of peace.

And the end is not yet. Progress continues at an accelerating rate. See what electricity has accomplished within our easy recollection—yet we scarcely realize it unless for even a single day we have no telephone, no electric light, no street car. The growth of the telephone in its first ten years is exceeded by the present growth of a single year; the output of all the electric central stations at the end of the first ten years is exceeded by that of many a single station today.

But I am merely repeating what we all know. I simply ask you to realize that the engineer has been foremost in bringing about our present civilization, and that to him new and larger problems are continually presented. Not only do the quantity and the difficulty of his work increase, but it even promises to be of a new quality. With the Twentieth Century there begins a "new knowledge" in science; from it there may soon follow a new engineering.

Value of Co-operation.

These increasing responsibilities demand that the most efficient methods be found. The characteristic of the modern method of large accomplishment is co-operation, by which men act not as individuals but in concert. Years ago each engineer was apt to work by himself; technical knowledge and experience were kept secret. Stagnation resulted. Through intercourse of knowledge and interchange of experience, progress came, and in those branches where discussion has been most active progress has been most rapid. The engineering society has become the clearing house for knowledge and experience. And herein is the great purpose of this building. It is now the instrument of co-operation among engineers. It enables these societies to become more useful in the dissemination of knowledge, in the training and development of men, in the cultivation of high ideals, and in making the engineering profession more efficient in its great task of making this world a better place to live in.

The significance of this building is not in the past, nor in the present, but in the future; for the vitality which has prompted engineering development in the past is unabated now and will continue with increasing force in the future. Witness this event, a gift of a million and a half for buildings, supplemented by a million more, the largest investment for engineering in the history of the world, and this audience of a thousand men, representative of science, engineering, education, literature, art and government, gathered with sympathy and joy to bid Godspeed to the work we here inaugurate and acclaim this day the beginning of a new era in engineering.

Mr. Carnegie, it has been your great privilege to make this possible. You provide money; it has been transformed into bricks and mortar. But your letter gives more than money—in it is an ideal, "a union building for you all;" that, too, has transforming power; already the "harmonizing feature" is an active force, our societies are working together, they are getting a broader view of their position and new inspiration for the large work which lies before them.

As were were leaving your house on the day you made the gift, Mr. Fritz lingered a moment. When he overtook me he told me that he had said to you, "Mr. Carnegie, the day will come when this gift will be looked upon as one of the wisest and most useful you have ever made." And I am sure, I voice the sentiment of this audience when I say that John Fritz was right.

At the close of Mr. Scott's address, the architect of the building, Herbert D. Hale, presented the keys of the building to the chairman, who in turn presented them to E. E. Olcott, president of the United Engineering Society, which controls and administers the building. In presenting the keys to Mr. Olcott, Mr. Hunt said in part:

"This gift to engineering, which we now dedicate, is not only or even principally the presentation to the societies of this material building. Immeasurable benefits will also flow from the orienting of the mines and directing the energy of engineers in a more effective co-operative work.

"We have an abiding faith that it is not engineers alone that will be benefited, but that the world itself is a better abode for man, because of Mr. Carnegie's great donation. We fondly hope that this home will bring purer aspirations and nobler ideals or more fruitful lives to the generations of men who will come after us."

Mr. Olcott's Remarks.

In accepting the key to the building, Mr. Olcott spoke in part as follows:

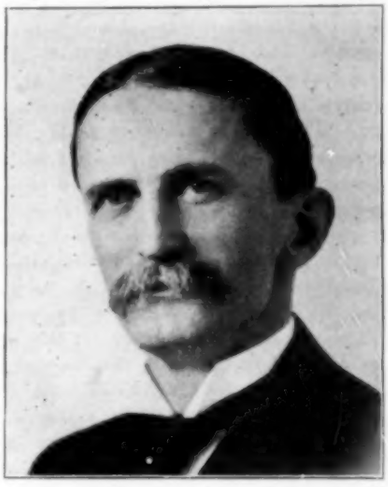
"These three societies (the founder societies) form a perfect union fittingly representing all the associate societies and standing for the engineering profession. May these all, without any loss of individuality, form a grand enduring whole which shall typify the national federation of our states, and may our individual engineers shine as do the stars on the field of our country's emblem. In this union there is strength. Depending on my own wisdom, it would be impossible to faithfully carry out the duties implied, and I could not attempt it, but for the phalanx of united engineering. This key opens the great bronze doors of knowledge, of usefulness and accomplishment and the building thus opened and dedicated is one of the world's greatest storehouses of the records of engineering achievement. The library which crowns it is already one of the most complete technical libraries in existence. When we can secure an adequate endowment, it will become even more important. It is open for the benefit of mankind. This key stands then for freedom and co-operation and the open door. With it we can unlock some of nature's hidden secrets. The engineer should be the altruist, content to seek not so much his own as the world's achievement. We cherish then the gift of the benefactor—a man whose very fortune is an exponent of united engineering and whose gift to us most truly embodies the man's own life and perfectly supplements in this metropolis his great institute dedicated last week at Pittsburg. Neither he nor we can live to see the good that this building will do, emphasizing, as it does, the strength there is in unity, that, through co-operation and the publication of the results of scientific research, we are helping to advance the progress of the world."

At the close of Mr. Olcott's address, Mr. Hunt presented Andrew Carnegie, the donor of the building, whose address was given in THE IRON TRADE REVIEW last week. A cello solo followed Mr. Carnegie's remarks and the orator of the day, president Arthur T. Hadley, of Yale university, then delivered an oration—"The Professional Ideals of the Twentieth Century," which was as follows:

Professional Ideals of the Twentieth Century.

A building like this is the best monument of what the twentieth century has accomplished.

The really important part of the history of a nation is the development of its ideals and standards. The specific things that it does are important not so much for their own sake, but for the sake of the evidence they give as to the trend of a nation's thought. It is not the magnitude of the individual battles which makes a war worth reading about. It is the ideas under which the war is conducted and the constitutional principles for which it is fought. It is not the census figures which decide whether a nation is great or small. It is the industrial methods and educational ideals which these census figures indicate. And in like manner it is not the buildings and machines and railroads and mines which constitute the important part of the history of the engineering profession. A book might give a good description of a thousand of these great engineering works, and yet fail of being in any sense a true history of engineering progress. The thought of the successive builders and the influence of that thought upon the conduct and ideals of other men are the things that we really care about. The story of the concrete achievements that have dazzled the eye of the world is but the unimportant and superficial part of the history. The real thing for which we care, the thing that helps us to understand the past and inspires us with hope for the future, is the story of the men who did the things—their struggles and their discoveries, their trials and their successes.



E. E. OLCOTT.
President United Engineering Society.

The men who did more than anything else to make the nineteenth century different from the other centuries that went before it were its engineers. Down to the close of the eighteenth century the thinking of the country was dominated by its theologians, its jurists, and its physicians. These were by tradition the learned professions; the callings in which profound thought was needed; the occupations where successful men were venerated for their brains. It was reserved for the nineteenth century to recognize the dominance of abstract thought in a new field—the field of constructive effort—and to revere the trained scientific expert for what he had done in these lines. Engineering, which a hundred years ago was but a subordinate branch of the military art, has become in the years which have since elapsed a dominant factor in the intelligent practice of every art where power is to be applied with economy and intelligence.

A building like this is therefore the symbol of all that is most distinctive in the thought of the century that has gone by. A hundred years ago we might have had a building in honor of theologians or of lawyers or of physicians; but one that symbolized the achievments of the engineer was beyond men's dreams, because the world at large had neither felt the need of his work nor dreamed how soon it would be seeking his leadership.

I have spoken of this building as a monument; but that is after all not the proper word. A monument implies that a man is dead, or at any rate that he has so nearly reached the limit of his growth that he might just as well be dead. Looked at in this way, the engineering profession wants no monument. It has not yet reached the limit of its growth. It has not come to the time when a complacent survey of the past will take the place of toilsome planning for the future. Not a head-stone do we want, but a mile-stone—a point at which our measurement of what has been already done serves as an inspiration for the journey yet to be traversed. We may take this opportunity for a brief review of what has been done in engineering and other allied professions; but the engineer who is worthy of his calling will value that review most highly if it is made a means of calling his attention to that which yet remains to be done.

Science and Commercial Practice.

A hundred years ago there was a sharp separation between scientific theory and commercial practice. There

was not a great deal of science anyway, outside of mathematics and astronomy; and what there was was underrated by men of affairs. In those days when a man said he was practical it meant that he was not theoretical; that he didn't know science, and didn't want to know it, and didn't want to have any man around that did know it. The men of that day trusted to two guides; inherited prejudice, and individual experience. The more enlightened among them used experience to correct prejudice; the rank and file of them used experience to reinforce prejudice; and that was about all the difference. The value of generalizations, except in religion and in statecraft, and in some few branches of medicine, was not recognized by anybody.

The great element of progress in the nineteenth century has been the recognition on the part of mankind in general of the value of scientific generalizations in every department of human conduct. Our science has become sounder, our understanding of its applications clearer; and the public has recognized that scientific conduct of a business means the substitution of universal experience, learned with difficulty and applied with toil, for the narrower range of individual experience which was at the disposal of the so-called practical men of fifty or a hundred years ago. Of this change the engineer is the representative and the leader. He it is that makes physical science in its various lines applicable to the complex problems of construction and development. He it is who has paved the way for the recognition of the technologist and the expert in every line of human industry. He it is who has shown how mathematics, instead of being an abstract discipline, remote from every day human affairs, may become the means of applying truths for a long time remote and undiscovered to the everyday affairs of the world in which we live. Not the buildings that you have built, gentlemen; not the railroads that you have planned; not the machines that you have invented, represent your greatest achievement. Yours is the proud boast of having in one brief century established science as the arbiter of the material affairs of mankind, and of having enforced her worship upon a world once reluctant but now gloriously admiring.

Public Duty of a Professional Man.

What then? you will ask. Is there anything which remains to be done comparable in importance to this? Yes, there is. An equally large part—perhaps in one sense a much larger part—of your professional duty yet remains to be accomplished. It is not enough to have technical training. It is not enough to know the special sciences on which the practice of a profession is based. A man ought to have clear conceptions of the public service which his profession can render and the public duty which its members owe. Thus, and thus only, can the engineer, the lawyer, the physician, or a member of any other learned profession, rise to the full dignity of his calling.

For there are two quite distinct qualities which must be combined in order to secure the best professional service; two quite distinct tests which work must meet in order to be pronounced first-class. One of these is the technical standard; the other, for want of a better word, may be called the ethical standard. The man who wishes to build a good railroad must not only lay it out according to the rules of the surveyor's art, with proper curves and grades and bridges which will not fall, but he must also have some intelligent regard to the needs of the population, the safety of travel, and the many other factors which determine whether a railroad shall be a work of public use or a source of industrial bickering and financial disaster. This combination of public and private demands is not peculiar to engineering. It can be illustrated in every other profession of importance. It is not enough for the lawyer to give advice which shall be technically sound and which shall enable his clients to keep out of jail. He must learn to take a large view of the law as a means of public service instead of private gain. It is not enough for the physician to know how to cure specific diseases. He must know how to care for the larger problems of public health and to use the resources of the community in a way to meet as fully as possible its sanitary needs.

This larger view of professional obligations is not so fully recognized as it should be. We have in the nineteenth century made so much progress in the technical training of doctors and lawyers and engineers that we sometimes forget that there is need of anything more than technical training. We have let the old idea of public leadership which was prominent in the minds of the great professional men of past centuries, give place to another and narrower ideal which is fully satisfied when a man has made himself a technical expert. Many a man of real eminence in his calling deliberately rejects the wider conception of professional duty which I have here indicated. Perhaps he recognizes the claims of public service, perhaps he does not; but in any event he believes that these claims rest upon him as a man rather than as an engineer or a lawyer. In his professional capacity he says he is hired not to tell what the law ought to be but what it is; not to advise how a railroad can do the most public service, but how certain men with certain ideas of their own can best use the differential calculus to get those ideas carried out. This is perhaps the prevalent view of professional ethics today. I believe that it is a wrong view, which must menace not only the influence and standing of the professions themselves, but the general interests of the republic.

In the first place, a man who believes that he is hired to carry out another man's ideas can never claim a position of actual leadership. He remains a paid servant—highly paid, doubtless, because he is possessed of a kind of skill which is very unusual, but nevertheless a servant, bound to carry out the wishes of his master. A group of professional men which regards this as a proper view thereby forfeits the claim to stand in the first rank socially and politically, and voluntarily accepts a position of the second rank. I do not believe that the engineers of America want to do this. It has been said that engineering is the handmaiden of commerce; but I do not believe that the men who have planned and dedicated this building will be satisfied with any handmaidenly conceptions of what their successors ought to do. If for a moment, in our zeal for new technical developments, we have let our responsibilities as public servants fall out of our hands, I feel sure that we shall be ready to take them up again as soon as our eyes are opened to the real situation.

More Needed Than Technical Achievement.

The mere technical achievement is not the thing that endures. Among the peoples of the ancient world, I suppose that there were no engineers equal to those of Egypt. Considering the means at their command, the things that they did were absolutely extraordinary. They did some things which, even with the means at our command, we can hardly duplicate. But they used their abilities in the service of a dominant priestly caste; and therefore, while their work fills us with admiration, it does not appeal to us as does the work of the Roman engineers a few centuries later, who built roads and aqueducts and bridges, and thus took the lead side by side with the Roman lawyers in establishing the basis of modern civilization. The roads and bridges of Rome, sim-

ple and straightforward as they are, constitute a more enduring monument to the Roman engineers than all the obelisks and pyramids that were ever erected.

For their own sake, then, and for the sake of the enduring quality of their work, we can appeal to the engineers and lawyers and physicians to see that it is adapted to public ends. We can reinforce this appeal by a yet stronger one on behalf of the American commonwealth as a whole. For the development of technical ideals and standards in our various professions during the last few centuries, to the neglect or exclusion of ethical ones, is constituting a very serious public danger.

Value of Public Opinion.

A commonwealth like that of the United States is necessarily governed by public opinion. Courts may formulate this opinion. Legislatures may pass rules to give effect to it. Police may enforce its demands against the recalcitrant. But the governing power rests in the intelligent public opinion itself. When that opinion ceases to be intelligent and powerful, freedom becomes a mere name. Now a serviceable public opinion of this kind can only be formed when intelligent people, technically trained for different lines of life, seriously try to find out how their work can be made to meet the public needs. They are the only ones who can do this well. If it is done by anybody else it will be done badly. If the lawyers as a class try to keep the law in line with the demands of intelligent public opinion, we can get good law. But if lawyers are content to see the law perverted to private ends, and judges take refuge in technical construction of precedents, without full regard to the needs of the existing situation, legislatures will step in to create a chaos of conflicting laws which are worse than no law at all. In like manner, if our engineers get their own minds clear, and get the public mind clear, as to the political economy of the properties entrusted to their charge and the ethics of their management, they can forestall those conflicts which now threaten to break out at any moment. But if the members of a profession whose advice is necessary in order to a clear understanding and wise settlement of these problems retire from the field of action, the matter will be settled by those whose interests are mere selfish and less farsighted. There are three professions today which do not regard themselves as servants, but as masters —the financier, the journalist and the politician. If the engineer and lawyer accept positions as servants, simply putting their technical knowledge at the disposal of merchant, journalist, or politician who will pay the highest price for it, it is not simply a confession of inferiority, it is a dereliction of public duty.

Necessity of Board Ideals.

Do you say that it is impossible for a single man or group of men to remedy these evils? Look at the career of Albert Finck, who in 1874, when he was an engineer on the Louisville & Nashville railroad, made a study of the cost of transportation which has been at the basis of all the intelligent management of the traffic departments of railroads from that time to this. Of course Albert Finck was a rare man. He could do things that some of the rest of us cannot. But I verily believe that if our professions could awake to the necessity of broad ideals like those of Finck the greatest dangers which threaten the American commonwealth would be fairly met, and the men who met them would be given the positions of power and trust which they had proved themselves worthy to hold. Nobody is satisfied today with the struggle between individualism and socialism, between financier and politician, between Wall street and Washington. The men who are engaged in this conflict are for the most part heartily sick of it. Let a man or group of men arise who add to their technical knowledge a readiness to use the knowledge in the public service, and people will be ready to put them in charge of affairs and follow where they lead. We have outgrown the day when a little common sense was sufficient for managing the affairs of the nation. They are become too complex; and this complexity gives the engineer, if he will add to his training in mathematics a training in ethics and political economy and the fundamental principles of the law, an opportunity such as never before existed to claim and receive the position which rightfully belongs to him.

The Broadening of Ideals.

There arises now and then among our engineers a man with this quality of looking into the future—call it genius, call it insight, call it imagination. One of your own members said in a memorable speech that the thing which distinguishes a man of the first rank in his profession from a man of the second rank is the possession of this quality of imagination. Unfortunately it is rare. We cannot all of us have it. But we can have more of it than we now have, if we will modify our training and widen our standards of professional success. Excellent as is the course in our technical schools, it does tend to have a narrowing effect instead of a broadening one. The ideals of our engineering societies are high, but they are not always as broad as they might be. The widening of the course in the schools and greater readiness in our associations to recognize services which we now call non-professional will, I am convinced, do more for the engineers and more for the community than would be represented by ten years' progress in mining or machinery and the various developments of applied science.

We celebrate today, and we are justified in celebrating, the recognition of science as a necessary guide in the conduct of the material affairs of each man's business. Half a century hence, when our descendants shall meet in this building or some greater building, I am confident that they will celebrate a yet greater thing—the recognition of the right of men of science to take the lead in enlightening the thought of the people on public affairs and the responsibility of filling the highest positions in the service of the commonwealth.

Wednesday's Exercises.

The exercises of Tuesday were strictly dedicatory in their nature and afforded occasion for the expression of gratitude of the entire engineering profession to Mr. Carnegie. Wednesday was founders' day. The exercises were under the auspices of the three founder societies and addresses were delivered by their representatives; distinguished foreigners were present to voice the congratulations of engineers abroad; messages of greeting and felicitation almost without number were presented; and finally the events of the day were fittingly crowned by the award of the John Fritz gold medal to one of America's foremost inventors and by the grateful recognition of the services of a trio who have played a leading part in the progress of the great engineering societies.

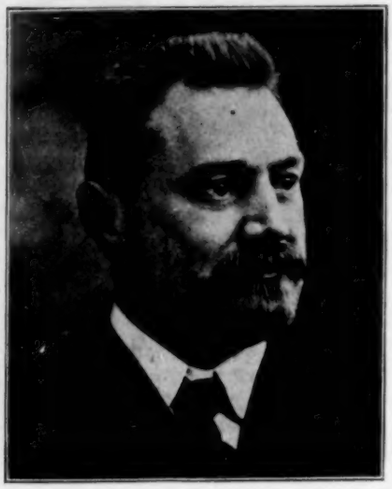
John W. Lieb Jr., on Peace.

The chairman of the Wednesday gathering was John W. Lieb Jr., past president of the American Institute of Electrical Engineers and chairman of the dedication committee. In the course of his introductory remarks he said:

Engineers have ever been leaders in promoting international friendship, and by their international congresses and the interchange of visits between foreign societies they have established the most enduring cordiality of relations between large bodies of influential men separated by national boundaries, but having common professional

ideas and the same spirit of enlightened progress.

We may, in fact, at this very time rightly consider ourselves a kind of auxiliary to the great International Peace Congress which is now meeting



JOHN W. LIEB JR.
Ex-President A. I. E. E., Chairman of Dedication Committee.

in this city. The engineering societies are now enjoying, through the generosity of Andrew Carnegie and the cooperation of the friends and members of the societies, the realization of the fond hopes they have cherished for years, and with the opening of this building there opens also a new era for the engineering profession in this country.

The Growth of Engineering.

Dr. Samuel Sheldon, president of the American Institute of Electrical Engineers, spoke first as a representative of the founder societies. He reviewed the growth of these three organizations and the allied societies and spoke of some of the present day and prospective engineering problems. In part he said:

The founder societies at the present time have a total membership of about 12,000. Of these nearly 16 per cent live in New York city, or in its immediate vicinity, and to them this building is accessible. Other associated societies, with an approximate membership of 4,000, are also at home here, nearly 40 per cent of whom dwell in this vicinity. An inspection of the curves of growth of membership in the three founder societies shows that the enrollment will be doubled by 1,920, if past policies of management be maintained.

During the past few years there has been a rapid growth in civilization; commerce, traffic, manufactures, organization, fortunes, knowledge and individual efficiencies have increased. Excessive and extraordinary growth has resulted from the efforts of electrical engineers. Doubtless this is due to the youth of the profession, whose oldest workers are not thinking of retirement, but, on the contrary, are enthusiastically and energetically productive.

Rapid growth and the character of his work necessitates that the engineer shall continually deal with the probabilities of the future. The remarkable economies resulting from an extensive engineering study, based upon more or less uncertain future conditions, of the problem of supplying telephone service in New York city twenty years hence, were called to the attention of the members of the American Institute of Electrical Engineers in a recent paper.

We are all familiar with the frantic struggles of engineers in charge of public utility central stations in their efforts to have modern apparatus manufactured, purchased and installed quick enough to carry the ever increasing load, but not so quick as to long stand idle and bring down the wrath of the financier. Reprehensible neglect to consider future conditions has resulted in an intolerable congestion of traffic in certain parts of this city.

The Engineer as an Economist.

Frederick Remsen Hutton, president of the American Society of Mechanical Engineers, spoke briefly on the subject, "The Economic Significance of the Engineering Building." This he defined as three-fold, internal, external and educational, and then added:

Finally the Engineers' building stands to rebuke certain economic fallacies. It is a convincing answer to a contention that manual labor of arm and brawn are the only real creators of wealth in the production process, and that the reward of toil is to be directed entirely to him who contributes bodily effort. It says to such a theorist that misdirected toil and labor, which go for naught through ignorance of physical or economic law, will impoverish the community, not enrich it. Experiments are costly, when at their basis lie assumptions contrary to fact and truth. Furthermore, labor must be organized and must be directed by knowledge; its tools and its operations must also be designed and planned on a basis of knowledge and experiment.

The director and organizer of labor is, therefore, to be compensated both practically and in public consideration in proportion to his economic value. The engineer as a factor in production far transcends the significance of the mere craftsman, and this building evidences the truth and the fact. The economic future does not lie amid the dreariness of some of the contentions of the socialist. It lies in releasing more and more the human unit from the stress, which we lay upon the beast of burden. In this releasing process the engineers will be inevitably the leaders.

For the mining engineers, Dr. John Hays Hammond, president of the American Institute of Mining Engineers, spoke briefly and happily of the importance of this branch of the profession, from the early-day period when its followers braved the savages of unexplored wilds and the fevers of tropical countries up to the present.

One of the most pleasing features of the exercises was the welcome voiced by President T. Comerford Martin, of the Engineers' club, to its handsome home adjoining the Engineering building proper. This was happily put in verse and Mr. Martin was frequently interrupted by applause as he recited the following:

To our fellow engineers, who've been looking many years,
Uptown and down, for a home whose rental wasn't high;
We, members of the club, which has also felt the rub
Bring greetings from our Little House nearby.

With you we share the gift; with yours, our voices lift
In praises of Carnegie, who aimed our kindred fates to tie.
"A home for you all" is graven on your wall,
And, deeper, on the cosy Little Club nearby.

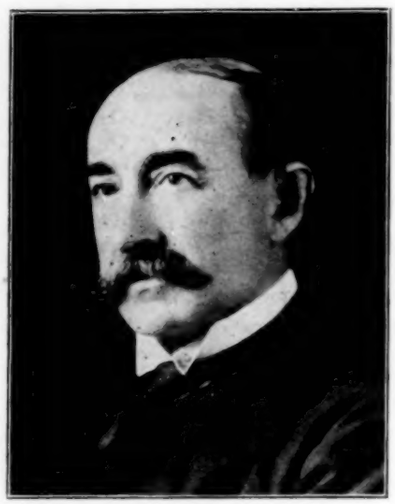
Here may brethren dwell in peace; here may your tribes increase;
Here may the founts of Knowledge ne'er run dry.
But for leisure moments sunny, or refreshing milk and honey,
Come over to the kindly Little House nearby.

When weary of the jargon of 4 Pi and of argon,
And of engineering problems that daily multiply;
Just step across the alley, or by the high bridge sally
To the solace of the cheery Little Club nearby.

You are Mining or Electrical, Transportation or Mechanical.
All for truth and fact and data in full cry;
But in the Club we're human, not forgetting there is woman;
And all are welcome in the Little House nearby.

To us within these walls, to all Fair Science calls,
Onward and upward; as our temples pierce the sky!
So to your flow of soul, we shall pledge our brimming bowl,
Comrades! playmates! in the Little House nearby.

The presentation of greetings and felicitations from foreign and national



JOHN HAYS HAMMOND,
President A. I. M. E.

scientific societies and institutions of learning protracted the proceedings to considerable length, as in all more than fifty such messages were either given by personal representatives or mailed and cabled to the chairman for read-

ing. Among those who spoke briefly were: Sir William Preece, representing the Institution of Electrical Engineers of Great Britain, also an honorary member of the A. S. M. E.; Walter C. Kerr, trustee of Cornell university; R. A. Hadfield, past president of the Iron and Steel Institute of Great Britain and a Bessemer medallist; representatives of the Verbund Deutscher Electric and the Societe des Ingenieurs Civils de France; Dr. Henry Pritchett, president of the Carnegie Foundation; Charles Kirchhoff, representing the Verein Deutscher Eisenhuettenleute; Leon Gaster, representing the Faraday Society; John W. Lieb Jr., for the Associazione Electrotecnica Italiana; and Captain Baxter, U. S. N., representing the Society of Naval Architects and Marine Engineers and speaking for the associated societies. In addition to these a large number of illuminated addresses and other messages of greeting were briefly referred to by the chairman. These came from learned societies, institutions of learning and from scientists and engineers of distinction the world over.

It was announced that Dr. James Douglas, past president of the American Institute of Mining Engineers, had been suddenly called to Europe by the death of his daughter and that consequently his address would not be presented. This completed the exercises of the day with the exception of the presentation of the medals.

Presentation of the Fritz Medal.

Twice during the two days did the assemblage honor a man by rising while they cheered for him. Once was when Andrew Carnegie was introduced during the exercises of Tuesday. The other was when, just previous to the presentation of the gold badge to Alexander Graham Bell, John Fritz was conducted to the stage. The ovation tendered him was most enthusiastic. Then, as chairman of the board of award, Charles F. Scott bestowed upon the venerable inventor of the telephone the prized bit of gold purchased with the fund raised in 1902 by friends of John Fritz. In response Mr. Bell said the token would be valued, not only for the honor it implied, but because it was presented in the "capitol of engineering," and above all, because it was given him in the presence of Mr. Fritz himself. The original award of the medal, in 1902, was to Mr. Fritz; in 1905 it was bestowed upon Lord Kelvin for his successful work in connection with cable telegraphy, in 1906 to George Westinghouse for the invention of the air brake and in 1907 to Dr. Bell for the invention of the telephone. Dr. Bell is fast accumulating honors. He is a past president of the American Institute of Electrical Engineers and is now on his way to England to receive the degree of Doctor of Science from Oxford university.

The dedicatory exercises closed with the conferring of what are to be known as "Distinguished Service" medals upon two men who have given twenty-three and another twenty-two of the best years of their lives to the upbuilding of the three founder societies. The representation was made by Dr A. R. Ledoux, past president of the American Institute of Mining Engineers, and the recipients were Ralph Wainwright Pope, secretary of the A. I. M. E.; Frederick Remsen Hutton, past secretary of the A. S. M. E., and Dr. Rossiter W. Raymond, secretary

RALPH W. POPE.
Secretary A. I. E. E.

of the A. I. M. E. The presentation was preceded by the reading of historical sketches of the three men, in which their extraordinary work was reviewed and a thorough appreciation of their efforts expressed.

Special Meetings of the Week.

Professional sessions of the founder societies were held during the week. Monday evening Sir William H Preece presided at a special meeting of the A. I. E. E., at which a paper was presented by Louis M. Potts on the Rowland telegraphic system and its apparatus. Thursday afternoon the A. I. M. E. listened to an illustrated paper by H. T. Hildage on mining operations in New York city and vicinity, descriptive of the excavation and tunnel work now in progress. Thursday evening before the A. S. M. E. Brigadier-General Crozier spoke on the Ordnance Department as an engineering organization. On the following evening at the Madison Square Garden concert hall the A. I. M. E. held a well-attended smoker for the members of the founder societies.

BOOK REVIEWS

"Switchboards" by William Baxter Jr. New York. The Derry-Collard Co. 5¾ x 8 inches. 192 pages. Illustrated. Cloth. Supplied by THE IRON TRADE REVIEW for $1.50.

This book while somewhat elementary in character presents much information that is usually difficult to obtain. It shows the construction of switchboards for a large number of different installations, the illustrations being drawn from actual practice. Wiring diagrams of various types of switchboard are presented and the uses of the various connections shown by each diagram are thoroughly explained. A chapter is devoted to the construction of switchboards and Part II of the book deals with switches showing the various kinds including oil switches and circuit breakers.

The book will prove of value not only to the electrician in the power house, but to the engineer, who, while he may be familiar with the general subject is ignorant of details.

Peabody Atlas, by A. Bement. Chicago. Peabody Coal Co. 149 pages. 16¾ x 18¾ inches. Cloth. Supplied by THE IRON TRADE REVIEW, for $5.00.

The Peabody Atlas of coal mines and railways in its present form is a development from its first appearance as a large wall map in 1902. At that time but two states, Illinois and Indiana, were included in the area covered.

The information compiled proved to be so much sought for and of such value to coal operators and the railroads interested that it was found necessary to increase the amount of ground covered. The book in its present excellent form shows five additional states, whose coal fields have never been treated in this manner before, namely, Ohio, West Virginia, Western Kentucky, Missouri and Iowa.

The qualities of the various coals, their heat values, their production and relative commercial importance are all given in detail. General and detailed maps of the different coal areas are presented in elaborate form. All of the coal mines in the states named above are listed, both with relation to their geographical location and in reference to the railroad over which they ship. The book matter is concluded with several articles on proper boiler construction for obtaining maximum heat values and a discussion of smoke prevention.

BY-PRODUCT COKE OVENS AND THEIR FIELD.

At the meeting of the New England Foundrymen's Association held at Boston April 10, Edwin A. Moore, president of the American Coke & Gas Construction Co., Camden, N. J., read a paper "By-Product Coke Ovens and Their Field."

Mr. Moore's Paper.

Mr. Moore gave a brief history of the by-product coke oven industry in this country, saying that it was developed abroad, having been introduced as early as 1856. The extended use of these ovens followed the very important improvements made by the eminent Dr. C. Otto and Gustav Hoffman, of Germany, hence the Otto-Hoffman system, which is controlled in this country by the United States Coke & Gas Co. under the United-Otto system. Ovens of very different constructive features were also developed abroad and are known there, as well as in this country, as the Semet-Solvay system. The first by-product ovens built in this country were installed by the Cambria Steel Co., at Johnston, Pa., in 1894. That plant has since been enlarged by three extensive additions. It was installed for the purpose of mining and coking the coal which could not be coked by any other process economically, and has been successful beyond expectation. The Solvay Process Co. about the same time installed a small plant in connection with its process works at Syracuse. The industry has not developed without much opposition, in spite of the fact that by-product ovens have produced all the coke used throughout Germany and elsewhere on the continent, and to a great extent in England, for years. Blast furnace men condemned the new process and often avoided investigating its merits. Today, however, all this is changed. By-product ovens are commanding the serious investigation and attention of the most advanced men in the country. They are recognized as a necessity to enable the use of various grades of coal which can not be advantageously utilized by any other means. Since the introduction into this country of the original plants of both the United-Otto and Semet-Solvay systems, the following plants have been installed under the respective systems:

Cambria Steel Co., Johnstown, Pa., (four installations)	372	ovens
Pittsburg Gas & Coke Co., Glassport, Pa.	120	"
New England Gas & Coke Co., Everett, Mass	400	"
Dominion Iron & Steel Co., Sidney, Cape Breton	400	"
Hamilton Otto Coke Co., Hamilton, Ohio	50	"
Lackawanna Steel Co., Buffalo, N. Y.	564	"
Lackawanna Steel Co., Lebanon, Pa.	232	"
South Jersey Gas, Electric & Traction Co., Camden, N. J.	150	"
Maryland Steel Co., Sparrows Point, Md.	200	"
Michigan Alkali Co., Wyandotte, Mich.	30	"
Sharon Coke Co., Sharon, Pa.	212	"
Zenith Furnace Co., Duluth, Minn.	50	"
Total	2,780	ovens
Syracuse, N. Y.	40	ovens
Dunbar, Pa.	110	"
Ensley, Ala.	240	"
Wheeling, W. Va.	120	"
Sharon, Pa.	25	"
Detroit, Mich.	120	"
Chester, Pa.	40	"
Lebanon, Pa.	90	"
Milwaukee, Wis.	160	"
Geneva, N. Y.	30	"
Chicago, Ill.	120	"
Steelton, Pa.	120	"
Total	1,215	ovens

"Without going into details for figures, we have assumed," said Mr. Moore, "that these 3,995 ovens, comprising the two systems mentioned, have a coal carbonizing capacity equal to nominally 25,000 tons. These figures, however, do not represent one-eighth of the coal daily converted into coke in the United States.

Many Improvements.

"Great developments and improvements have been made in by-product oven installations during the past five years. Results have been obtained beyond the most sanguine expectations. To illustrate, we will state particularly the productive capacity of 400 of the most modern ovens, which, please call to mind, is the size of the plant at Everett. A plant could easily be installed on the same area occupied by the ovens and by-product departments which could carbonize daily 3,600 net tons and operated practically by the same force. The daily production of coke and by-products from this quantity of coal of a good average percentage of volatile would be:

Coke	2,700 net tons
Surplus rich or illuminating gas	16,200,000 cubic feet
Ammonium sulphate	72,000 pounds
Tar	36,000 gallons

"These by-products—gas, ammonia and tar—now being wasted in the production of coke by the antiquated bee-hive method to the extent of at least 40,000,000 tons of coal per year on the present basis of output represent a startling amount when converted into money representation, aggregating per annum substantially for

Gas, consumed for use as fuel at a value of 8 cents per 1,000 cubic feet	$14,400,000.00
Ammonium Sulphate	18,000,000.00
Tar, on the basis of its fuel value at 1½ cents per gallon	6,000,000.00
Total	$38,400,000.00

"These figures ignore entirely the very important fact that a considerable percentage of coal is consumed in the process of coke making by the bee-hive method, which loss is avoided in the by-product process due to the by-product oven being a sealed tight retort, while the bee-hive oven must be vented at the inlet of coal and outlet of coke to maintain combustion throughout the coking period, thus necessarily consuming considerable of the coal, in addition to the wasting of all the volatile substances or by-products driven off to the atmosphere. With these figures based on facts as to material products being annually wasted we inquire naturally, if they are saved, how can they be utilized?"

Uses of By-Products.

Mr. Moore spoke at length as to the uses of by-products, especially of the use of gas in many steel plants, and of ammonium sulphate as a fertilizer. Then, turning to the consideration of coke, he said that in the early days, about all the troubles of the foundry were attributed to bad iron, but in later years, foundrymen have become much better informed concerning iron, and blast furnaces through the aid of the chemist are able to produce a more uniform grade of iron. Hence, it has come to pass that the troubles of the foundryman are now blamed upon the fuel rather than upon the iron. He declared that by a combination of various coals in a suitable mixture carbonized in by-product ovens, it is possible to produce a foundry or metallurgical coke of such analysis and structure as will prove superior to even the Connellsville 72-hour bee-hive coke. "This," he said, "is being done in various localities, notably in the vicinity of Detroit, Chicago and Milwaukee, and much effort is being expended in studying and meeting the requirements of the foundrymen, and so satisfying have been the results that by-product foundry coke commands a premium in price over any other coke sold in these markets. It is only a question of time," he said, "when this fact will be as fully realized and appreciated by foundrymen as has been the case in recent years in the selection and use of pig iron regardless of the brand or maker."

THE ART OF CUTTING METALS[1]

(Concluded.)

By Fred W. Taylor.

QUALITY OF METAL BEING CUT.

Effect of the Quality of the Metal Being Cut Upon Cutting Speed.

Although we have given a large amount of study and made great numbers of experiments upon the effect of the quality of the metal being cut upon the cutting speed, yet we have met with less success in reducing this subject to a scientific basis than in the case of any other of the elements affecting the cutting speed of tools. In the present state of the art, at least so far as our knowledge of it extends, it is impossible to predict with accuracy the exact hardness (or more properly speaking, the effect of the quality of the metal upon the cutting speed) of the various forgings and castings which are worked upon in a machine shop doing a large variety of work.

However, while this element of the problem presents great difficulties still in the various machine shops which we have systematized we have always sooner or later succeeded in training the man who with the slide rule directs the speed of the machines so that he is enabled to predict with a fair degree of accuracy the hardness of the great bulk of the materials which are machined in the shop. This involves not only a careful study of the general data which we have obtained on this subject, but also a long and detailed study of the average hardness of the particular set of forgings and castings which the shop deals with.

We would emphasize the fact that this study can only be made and the very useful knowledge which it supplies can only be attained through a careful investigation of the hardness of the individual forgings and castings as they are from time to time found in the shops. Such an investigation frequently results in a temporary delay in turning out the work in hand, and while it takes place, is of inconvenience to the general running of the shop and is expensive both in time and money. However, the final results obtained from such careful study are of the greatest value and assistance in increasing the output of the shop.

In well-managed shops the collateral advantages which result from these experiments are also great. With the task system of management, when the attention of the superintendent of the shop is brought to the irregularity in the quality of the forgings and castings which are machined, if he is a man of the proper caliber, he takes steps to see that his castings and forgings are purchased upon carefully written specifications so as to establish a greater degree of uniformity; and this generally results both in a better quality of forgings and castings and also in materials which can be machined at higher cutting speeds. On the other hand, the type of superintendent or foreman is very frequently met with who can see nothing but the difficulties of obtaining sufficiently accurate data to enable the slide rule man to properly do his work, and such men are generally so firmly convinced that no good can come of the whole scheme of attempting to lay out tasks for workmen, that the company having a superintendent of this type had better either use some other scheme of management than ours or get another superintendent.

Systematic Classification of Steel Forgings and Castings According to Their Cutting Speeds.

For practical use in the machine shop it is evident that the most important and logical method of classifying all forgings and castings which are to be machined is in accordance with their cutting speeds.

The man who operates the slide rules and assigns the proper cutting speeds for the machines is interested only in the quality of the forgings as far as it affects their cutting speeds. We have, therefore, divided all metals into classes according to their cutting speeds, which vary from one another with the common ratio of 1.1 viz:

Class No. 1 corresponds to that metal which will give us the highest cutting speed which we are likely ever to use in a machine shop;

Class No. 2 represents a metal whose cutting speed is that of Class No. 1 divided by 1.1, or

$$\frac{\text{Cutting speed of Class 1}}{1.1}$$

and so on, the cutting speed of each class being connected with the one preceding it by the ratio of 1.1.

It is of great importance to connect this numerical scale of hardness (which varies by the common rate of 1.1) directly and permanently with certain qualities of metal and with cutting tools of definitely known cutting properties. As a basis for accomplishing this we would state that Class No. 13 upon this scale corresponds to a cutting speed of 60 feet per minute, for a standard cut of 20 minutes duration when a high-speed 7/8-inch tool of the chemical composition of tool No. 27 (Table 118), is used taking a depth of cut of .3-16 inch and feed of 1-16 inch.

Our experiments indicate also that Class No. 13 represents a speed of 99 feet (in round numbers 100 feet) for the best high-speed tool (Table 116, Tool No. 1), running under the same conditions as stated in The Iron Trade Review, March 2, 1907.

With these data as a basis, our scale of "hardness classes" for metals can be connected with other shapes of tools and other qualities of tool steel, other depths of cut, and other thicknesses of feed, by reference to the various tables and formulae given throughout this paper.

In using this classification it will be noted that the best modern high-speed 7/8-inch tool, if cutting metal belonging to Class 1 would have a cutting speed of 316 feet per minute with a standard 3-16-inch depth of cut and 1-16-inch feed; and such a metal as this would be much softer than any steel which is cut in a machine shop.

For what we call a hard steel forging of about the quality of a hard locomotive tire, a cutting speed of 45 feet corresponds to Class 21¼, while a soft steel having a cutting speed of 198 feet corresponds to Class 5¾.

Having a clearly defined hardness classification of this sort for metals enables us to tie all of our experimental and practical work for years past together, even although tools of different chemical composition, and therefore of different cutting speeds, were used. This system of classification is also admirably suited for use on a slide rule.

Effect of the Quality or Hardness of Steel Forgings Upon the Cutting Speed.

There are three important elements which affect the hardness or the cutting properties of steel forgings:

a Their chemical composition.

b The thoroughness with which the metal is forged, that is, the amount that the cross-section of the ingot has been reduced in making the forging, and the forging heat.

[1]Presidential Address, A. S. M. E., 1906.

TABLE 127.—THE EFFECT OF QUALITY OF METAL BEING CUT UPON THE CUTTING SPEED.

The chemical analyses were made from drillings taken from the forging close to where test bars were cut which gave the physical properties. The test bars were standard 2 x ½-inch bars longitudinally from each end of the forging at such positions with relation to the axis of the forging as to give the average physical properties. Cuts on these forgings were taken with standard ⅞-inch tools of the quality shown in tools 26 and 27, table 118, using a standard 20-minute cut, 3-16-inch deep with 1-16-inch feed. In the adjoining column will be found the corresponding cutting speeds, which probably would have been obtained with the best high speed tool, as shown in tool No. 1, table 116. In the adjoining column are given the cutting speeds as figured for tool No. 1 by the empirical formula developed and shown at the head of the column.

CHEMICAL COMPOSITION						PHYSICAL PROPERTIES				STANDARD CUTTING SPEED IN FEET PER MINUTE FOR TOOL MADE AS NUMBERED BELOW IN TABLE 116 TOOL NO. 1. TABLE 118. TOOLS 27 AND 26		STANDARD CUTTING SPEED FOR TOOL NO. 1 AS FIGURED BY THE FORMULA $V = \frac{125\left(1-\frac{215}{(18+E)^2}\right)}{\sqrt{\frac{E}{1000}}-3-0.9}$
C	MN	SI	P	S	ANNEALING HEAT IN DEGREES	TENSILE STRENGTH	ELASTIC LIMIT	PER CENT OF EXTENSION	PER CENT OF CONTRACTION	NO. 27	NO. 26	NO. 1 ESTIMATED
0.105	0.25	0.006	0.04	0.038	1200	48570	24540	37.00	59.12	150		247.5
						47870	24440	41.00	64.95			
0.105	0.35	0.025	0.035	0.022	1400	51440	24440	35.00	62.53	140		231.0
						50530	24440	41.00	63.02			
0.105	0.20	0.014	0.03	0.032	1400	48380	23430	39.00	60.55	140		231.0
						48380	23430	40.00	59.04			
0.105	0.20	0.014	0.03	0.032	1400	49400	24440	39.00	62.53	140		231.0
						46530	22500	42.00	63.35			
0.105	0.30	0.014	0.03	0.032	1400	48570	24540	41.00	66.64	140		231.0
						48060	24540	39.00	65.98			
0.12	0.37	0.005	0.026	0.034	1400	49400	22410	37.00	54.29	130		214.5
						49400	23430	37.00	54.53			
0.12	0.37	0.005	0.026	0.034	1400	50420	23430	38.50	58.78	125		206.3
						50420	24440	38.50	66.37			
0.12	0.37	0.005	0.026	0.034	1400	50420	24440	39.50	60.55	120		198.0
						50420	23430	40.00	62.53			
0.32	0.42	0.070	0.038	0.022	1200	57850	28920	31.00	43.44	120		198.0
						56250	26560	35.80	50.26			
0.34	0.39	0.093	0.038	0.037	1350	63660	34630	23.00	47.56			
						61670	31700	16.00	18.30			
					1325	61360	31700	32.50	49.37	82.5		152.6
						59560	30560	30.00	53.26			
0.32	0.60	0.151	0.025	0.036	1235	71800	50930	12.50	20.42			
						72850	44830	17.00	43.44			
					1245	70280	32590	24.00	29.10	60		99.0
					1225	73850	35650	29.00	49.39			
0.34	0.54	0.146	0.035	0.031	1250	69030	30080	28.00	48.23	67.5		111.4
						71580	34770	29.00	51.90			
0.34	0.58	0.200	0.042	0.036	1350	69030	34770	22.00	33.46	62.5		103.1
						72610	36790	27.50	42.06			
0.34	0.64	0.193	0.033	0.035	1270	77920	38670	32.00	32.78			
						71300	35650	30.00	30.14			
					1310	70280	31580	28.00	42.24	62.5		103.1
					1270	71300	33610	26.00	43.74			
0.34	0.65	0.219	0.024	0.031	1325	70280	32590	30.00	50.14	62.5		103.1
						72320	33610	31.00	47.57			
0.34	0.54	0.176	0.020	0.037	1255	74900	40740	27.00	43.44			
						73680	38700	27.00	42.24			
					1300	70280	34630	29.00	44.34	60		99
						70280	32610	23.00	28.08			
0.34	0.60	0.183	0.032	0.035	1275	72830	34630	30.00	48.73	60		99
						71300	32590	29.00	49.57			
0.34	0.62	0.168	0.031	0.035	1225	76200	40740	30.00	44.64	57.5		94.9
						73680	38700	30.00	45.24			
0.35	0.62	0.172	0.034	0.029	1325	69770	34630	27.00	40.40	65		107.3
						70790	34630	25.00	43.44			
0.35	0.62	0.174	0.025	0.031	1260	73850	34630	30.00	42.84			
						74250	35650	27.00	41.92			
					1280	71810	35650	28.00	46.40	62.5		103.1
					1290	72830	35650	28.50	49.57			
0.35	0.67	0.193	0.025	0.041	1270	74250	36670	25.00	49.29			
						76800	38700	25.00	33.41			
					1290	75860	39720	24.00	50.42			
					1310	75370	39720	26.00	48.73			
					1340	71530	35510	26.50	55.00	62.5		103.1
					1350	72320	35650	30.00	52.92			
0.35	0.68	0.22	0.032	0.025	1300	72830	35650	31.00	49.56	60		99.0
						74350	36820	32.00	48.73			
0.36	0.39	0.134	0.029	0.029	1255	69770	32590	27.00	41.31	65		108.9
						68750	32590	25.00	47.28			
0.36	0.66	0.204	0.032	0.029	1250	75370	36160	21.00	36.63			
						77820	39200	24.50	40.39			
					1300	74350	37660	27.00	40.65			
						73350	37180	25.50	42.24			
					1340	68750	34630	26.00	42.84	65		107.3
						68750	34120	27.50	43.44			
0.386	0.64	0.200	0.040	0.032	1250	70280	34630	28.50	43.44	70		115.5
						70280	34630	29.50	42.24			
0.45	0.63	0.182	0.034	0.023	1350	79450	41760	28.20	42.84	55		90.8
						79000	40740	26.00	38.21			
0.45	0.69	0.226	0.028	0.039	1260	83520	46850	25.00	42.24	45		74.3
						86070	47870	19.50	39.97			
0.48	0.61	0.148	0.028	0.024	1350	77410	37660	27.75	49.01	50		82.5
						85520	41760	24.65	42.24			
0.47	0.67	0.373	0.032	0.032	1275	86580	55000	8.50	11.66			
						91520	44990	19.00	28.12			
					1450	83520	42780	23.00	37.26			
					1250	84540	43800	27.00	42.24			
					1450	91530	55220	19.50	25.74	38		62.7
					COOLED RAPIDLY	96770	56020	21.50	28.78			
					TREAT'D SEVER'L TIMES	102880	66240	16.50	21.49	20		49.5
0.53	0.66	0.258	0.028	0.027		102370	67220	20.00	44.04			
0.59	0.74	0.377	0.033	0.030	1100	108480	88060	10.50	11.66			
						110510	88060	16.00	24.30			
					1425	89120	43800	22.00	33.41			
					1150	93710	42780	23.00	34.38			
						101350	52960	20.00	34.05	20		49.5
					1440	101350	51440	19.00	29.44			
0.94	0.63	0.047		0.039	1050	122745	62880	10.00	15.37		25	38.0
						122330	66310	5.00	5.75		22	30
0.64	0.76	0.21	0.044			118500	70000	14.00				45.0
0.80	1.11	0.205	0.028	0.040		91670	60090	7.00	11.66	BY ACTUAL TEST		41.5
						101860	53980	5.00	9.73			

c The subsequent heat treatment which the forging receives, that is, whether it has been laid down to cool in the air, annealed, or oil hardened, and the exact temperatures of annealing and the rapidity of cooling.

All of these three elements are so complicated that for men not engaged in the manufacture of steel there is but little use in attempting to consider them. It may be said, however, that for steel containing 0.40 per cent of carbon or less, the percentage of carbon is a fairly reliable guide to the hardness or cutting speed.

Best Guide to Hardness as it Affects Cutting Speeds Lies in the Physical Properties of Steel as Indicated by Standard Tensile Test Bars Cut from the Body of the Forging.

The physical properties of steel constitute a fairly accurate guide to its cutting speed; and these properties are best indicated by the tensile strength and percentage of stretch and contraction of area obtained from standard tensile test bars cut from such a position in the body of the forging as to represent its average quality and then broken in the testing machine.

It is, of course, impossible in most cases for any ordinary machine shop to cut test bars from the forgings which are actually used in the shop. It is, however, entirely possible and in many cases desirable to purchase forgings and castings with certain guaranteed tensile strength, stretch and contraction, and thus insure both the superior quality of the metal bought, and at the same time obtain metal practically uniform in its cutting speed. In our search for a guide to the cutting speed of metals, this has proven the only reliable index to the cutting speed.

In Table 127, and also in Tables 63 and 64[2], we record a large number of steel forgings which were accurately standardized by us in the course of our experiments. Their chemical composition and physical properties will be found opposite the cutting speeds for our standard ⅞-inch tool, with standard 20-minute cut, 3-16-inch depth of cut and 1-16-inch feed, the speeds in one column corresponding to tool No. 27 (Table 118) and in the other column to tool No. 1 (Table 116[3]).

[2]IRON TRADE REVIEW, Feb. 14, 1907.
[3]IRON TRADE REVIEW, April 11, 1907.

We have purposely given a large number of forgings, many of them of chemical composition and physical properties closely resembling one another, in order to show that no absolute and accurate relation exists between the cutting speeds of forgings whose chemical, and even physical, properties very closely agree. A study of this table, however, will show that in general the cutting speeds grow slower as the percentage of carbon in the steel to be cut grows greater. In general, also, it will be noted that the cutting speed becomes slower as the tensile strength of the metal becomes higher, and that the cutting speed grows faster as the percentage of stretch increases.

We have discussed at considerable length in paragraphs entitled "Theory as to why pressure has no relation to cutting," a theory explaining why the cutting speed increases with an increase of stretch and diminishes with an increase of tensile strength. It may be proper to add that there are two reasons for a falling off in the percentage of stretch in steel forgings or castings; one of these being an increase in the hardness of the metal, and the other being an inferiority in the quality of the metal.

Now a falling off in stretch due to increased hardness in metal will cause a slower cutting speed in the tool, while a falling off in the percentage of stretch due to an inferior quality of metal will not necessarily cause a slower cutting speed. For this reason the physical properties of steel are not an exact guide to the cutting speed unless the quality of the metal is clearly known. By quality we here mean whether it has been made of good material, well melted, forged, and has received proper subsequent heat treatment.

We have developed the following empirical formula which is at least a partial guide to the cutting speed of steel of good quality when the physical properties of the forging are known as represented by a standard test bar 2 x ½-inch cut from the body of the forging and broken in a testing machine.

$$V = \frac{125\left(\frac{215}{1-(15+E)^2}\right)}{\sqrt{\frac{S}{10000}} - 3 - 0.9}$$

In which V = Standard cutting speed;
S = Tensile strength in pounds per square inch;
E = Percentage of elongation of specimen 2 by ½ inches.

The cutting speed as represented by this formula will be found in the column in Table 127, opposite the actual speeds obtained from running the tools, and an inspection of the figures given in these two columns will indicate the degree of accuracy with which the formula represents the facts.

It will be noted that in the very highest cutting speeds and also in the slower cutting speeds no values are given in the column for the formula. We omit these values because at both the high and low extreme limits, the formula does not correspond closely to the facts. We do not, therefore, feel satisfied with this formula, and shall endeavor to find a better substitute.

It is well known that in the harder grades of steel, particularly those which are harder than hard tire steel, both the tensile strength and the percentage of stretch are variable, that is, materially different results will be shown from test bars cut from the same forging. For this reason also the tensile strength and stretch, in our judgment, will never prove an accurate guide to the cutting speed of very hard forgings. However, it is the best guide at present known, and, therefore, has a certain value.

We have tried experiments along several different lines in our endeavor to find some quick and reliable index to the hardness (i. e., the qualities which affect the cutting speed) of forgings and castings, all, however, without satisfactory, practical results. Among these we would mention:

a the ordinary abrasive tests in which metals of known hardness are used to scratch the metal to be examined;

b indenting the metal which is to be cut by pressing a punch or knife edge with a given pressure down into the face of the metal to be tested, and then measuring the extent of the indentation;

c the use of a special drilling machine, in which standard drills are used under definite pressure, and in which the distance drilled in a given number of revolutions is measured.

The best apparatus of this type has been gotten up by William J. Keep, of Detroit. This is useful for certain castings, particularly when they are produced in the same foundry and from mixtures which are in a general way similar from day to day. It is applicable, however, to a comparatively small range of work.

One of the greatest needs in the art of cutting metals is a more accurate standard by which to foretell the cutting speed of forgings and castings, and this should form a subject for future experiments.

Effect of the Quality or Hardness of the Cast Iron Upon the Cutting Speed.

It is much more difficult to predict the correct cutting speed for cast iron than for steel, and as yet no reliable method for doing this has come to our attention.

Viewed from the standpoint of chemical analysis, the cutting speed becomes slower, the larger the amount of combined or cement carbon contained in the casting, and the cutting speed becomes less the smaller the amount of silicon contained in the casting. The amount of combined carbon, however, depends largely upon the rate of rapidity with which the cast iron has been cooled after being poured into the mold; so that the mixture of the metal in the cupola does not constitute an accurate guide to the hardness of castings.

It is needless to call attention to the fact that thin sections of cast iron which are cooled rapidly are harder and must be cut at slower cutting speeds than thick sections of metal made from the same heat and cast at the same time. Therefore, a study of the hardness of castings as it affects their cutting speeds must be made in each machine shop upon the particular castings actually used in order to obtain reliable results.

The Quality of Red Hardness in Tools Plays a Much Smaller Part in Cutting Cast Iron than in Cutting Steel.

It is a constant source of surprise that the high-speed tools do not make the same proportionate gain in cutting cast iron as they do in cutting steel. By comparing the cutting speeds of tools No. 85 (old-fashioned carbon tempered tool) and No. 65 (old-style Mushet self-hardening tool) with the best high-speed tool No. 1, it will be noted that in cutting cast iron the best high-speed tool cuts only about three and one-third times as fast as the old-fashioned carbon tool, while when cutting both very hard and medium steel, the new high-speed tool cuts between six and seven times as fast as the carbon tool.

We already have given[3] a partial explanation of these facts. A further explanation of this curious phenomenon lies in the fact that the most important property, namely, that which gives the great improvement in the high-speed tools over the old-fashioned tools, lies in the quality of red hardness which is possessed by these tools and which does not exist in the old tools.

[3] Iron Trade Review, Feb. 21, 1907.

It will be remembered that red hardness is the quality which enables a tool to withstand that portion of the wear which is caused principally by the heat produced through the pressure of the chip on the tool.

Now, in cutting almost all qualities of cast iron, the wear on the tool is due to two causes:

a the abrasive or grinding action of the carbon or gritty matter contained in the body of the iron itself; and

b the heat generated by the pressure of the chip upon the tool.

In resisting the second of these causes for inquiry to the tools (*b*) the quality of red hardness tends greatly to increase the cutting speed. However, there is no doubt that the first of the two causes (*a*) plays much the more important part in injuring tools which are cutting cast iron, and in resisting this abrasive action the quality of red hardness is of but little use. For the same reason also, in cutting sand on the outside of castings or a mixture of sand and iron, the high-speed tools are but little better than the old-fashioned, self-hardening tools.

Cutting Speed of Castings as Found in the Average Machine Shop.

As a broad general guide to the cutting speeds to be used for cast iron with the scale on the castings just as they come from the foundry, we would state that as the average of several machine shops in this country, it is our observation that medium cast iron may be said to belong to Class No. 18 to 19 in our scale of hardness, and that when cutting with a standard ⅞-inch tool, of the quality of steel tool of No. 1, Table 116, with a standard 20-minute cut, a 3-16-inch depth of cut and 1-16-inch feed, they have a cutting speed of 60 feet per minute. On the whole, what may be called the hardest castings frequently met with in machine shops are not harder than Class No. 24, giving a standard cutting speed as mentioned above of 35 feet per minute. While softer castings quite frequently met with are as soft as Class No. 11, and have a standard cutting speed of 120 feet per minute.

Effect of Scale on Cast Iron Castings Upon the Cutting Speed.

As to the effect of the average scale met with in castings in the average shop, our experience indicates that with very soft castings the average scale met with calls for a cutting speed only about one-half as fast as the cutting speed of the same casting below the scale, and that as the castings grow harder and harder, the cutting speed of the scale approaches that of the cast iron below the scale, so that with the castings referred to just above as "hard" castings, the cutting speed of the scale and of the metal below the scale is about the same. On the medium castings referred to, the cutting speed of the scale may be said to be, in general, about three-fourths as fast as the cutting speed below the metal of the scale.

We referred above to the effect of sand or a mixture of sand and iron upon the cutting speed of tools. In addition to this, however, we would state that when castings are made containing a mixture of sand and iron, far more work can be done by taking very coarse feeds, and we suggest as the standard remedy in machine shop practice, when these conditions are met with, the taking of a cut sufficiently deep to get well under the scale and then the use of as coarse a feed as practicable.

It is obvious that in many cases, owing to the light sections of metal being cut or owing to lack of pulling power in the machine, it is impossible to take very coarse feeds or very deep cuts. It by no means follows that when these coarser feeds are taken, an exceedingly slow cutting speed must be used. In many cases the coarse feeds when cutting mixtures of sand and iron can be accompanied by fairly high cutting speeds.

LINE OR CURVE OF CUTTING EDGE.

We have pointed out the effect which the curve or outline of the cutting edge has upon the cutting speed, and we have endeavored to make it clear that the curve of the cutting edge of the tool affects the cutting speed chiefly because of the variation in the thickness of the chip or shaving which it produces. In general, the larger the radius of curvature of the cutting edge and the more nearly the general curve of the cutting edge lies parallel in a general way to the center line, or axis, of the work which is being cut, the thinner becomes the shaving and the higher the cutting speed.

Tool with Cutting Edge Having a Curved Outline Produces a Chip Varying in Thickness at all Points.

We have also, in these paragraphs, endeavored to make it clear:

(*a*) That a cutting edge, with a curved outline, invariably produces a shaving which varies in its thickness at all points.

In Figs. 28[6], 35[6] and 34, (enlarged views of our standard ½-inch to 1¼-inch tools) are given (on a scale enlarged, in one case, four times the full size of the tool, and in the other case eight times the size of the tool) views of the actual sections of the chip as removed by tools having different shaped cutting edges. By referring particularly to Fig. 34 (enlarged view of ½ to 1¼-inch tool) in the case, for instance, of a cut ⅛ inch in depth, the large difference in the shaving which is produced in one case by our ½-inch standard tool, and in the other case by out 1¼-inch tool, will be clearly seen.

Large Curve for Cutting Edge. Thinning Down the Shaving Produces Faster Cutting Speed.

By referring to the practical tables (Tables 89 and 100[7]) for cutting steel, using ⅛-inch depth of cut and 1-16-inch feed, in the one case, with our standard ¼-inch tool, and in the other case, with our standard ½-inch tool, the difference in the cutting speed produced by the thinning down of the shaving, owing to the change in the curve, will be observed. The thinner shaving accompanying the 1¼-inch tool in cutting medium steel, for instance, gives a cutting speed of 112 feet per minute, as against a cutting speed of 81 feet for the thicker shaving of the ½-inch tool.

It is obvious that some general law must exist for determining the relative cutting speed of tools having different curves for the outline of their cutting edges and that we should be able to determine this law by plotting on an enlarged scale the exact shape of the two sections of shavings which are being removed, and then comparing these shapes with their corresponding cutting speeds. We have once or twice started on this line of investigation, but have never had the time, or as yet sufficient data, to enable us to determine accurately this law, and this would seem to form an important subject for future investigation.

The Cutting Speeds of Our Standard Tools of Different Sizes Compared When Using the Same Depth of Cut and Feed.

A comparison of the cutting speeds given in the practical tables, with the cross-sections of the chips shown in Fig. 34, will indicate the effect on the cutting speed of the various sections of shavings produced by different depths of cut and thicknesses of feed when using our several standard shapes of tools, varying from ½ inch up to 1¼ inch. In addition to obtaining this information we have at various times made experiments to determine the relative cutting speeds of shop tools which are in ordinary use and which differ very radically in the curve of their cutting edges. The writer is unable to give the full data connected with these various experi-

[6] Iron Trade Review, Jan. 24, 1907.

[7] Iron Trade Review, March 21, 1907.

ments. As a matter of interest, however, we record the following general results of this work.

Experiments Upon the Cutting Speeds of Parting Tools and Thread Tools.

Two sets of these experiments are of especial interest. One set was made during the year 1888 in the works of the Midvale Steel Co. upon a large steel locomotive tire, and the other in 1893 at the works of the Link-Belt Engineering Co., Philadelphia, upon the very thick rim of a cast iron fly wheel. It so happened that the men who were experimenting upon the cast iron fly wheel did not know of the experiments previously made upon the steel tire, and as the results of these two sets of experiments agree within from three per cent to four per cent, the probability of their being reliable is all the greater. These experiments were undertaken to determine accurately the relative cutting speeds for a parting tool and a thread tool when compared with our standard ⅞-inch round nose tool, and also with a tool having a straight line cutting edge, cutting a shaving of uniform thickness throughout.

By a "parting tool" we mean a narrow, square-nosed tool which is fed directly "end on" into the work for the purpose of cutting it or slicing it into two pieces. The two corners of the parting tools experimented with were rounded to the extent of about 1-64 of an inch.

By a "thread tool" we mean the ordinary tool for cutting the United States standard V threads, having a 60-degree included angle. The extreme point of this thread tool was also squared off to the extent of about 1-64 of an inch.

In cutting the steel tire, two different thicknesses of feed were used, namely, 0.0156 inch and 0.203 inch; in cutting cast iron also, two different feeds were used, namely, 0.0166 inch and 0.029 inch.

In each case the standard cutting speed was found, for the parting tool, when it was only so badly injured that it could be economically reground by grinding away the clearance flank of the tool only. In each case the ratio of the cutting speed of the parting tool with a given feed to that of a tool with a straight line cutting edge having ½ inch in length of the cutting edge under cut, and in which neither of the extreme corners of the tool were cutting metal, was as 0.66 : 1 when both tools were taking the same thickness of feed, that is, cutting chips of exactly the same thickness. The ratio of 0.66 : 1 was found to hold true when successively a thickness of chip of 0.0166 inch and of 0.029 inch were used with both tools, and also when different "durations of cut" were used with both shapes of tool. In one case a duration of cut of 20 minutes was experimented with for both tools and in the other case a duration of 60 minutes was used.

The ratio of a thread tool to a tool with a straight line cutting edge under the same conditions, that is, when both were fed with the same feed, "end on," straight into the work, was as 0.45 : 1.

Practical Rule for Finding Proper Cutting Speed for a Parting Tool When High-Speed Steel of Quality of Tool No. 1, Table 116, is Used.

The practical problem, however, for the man who is running a machine shop is to find quickly, when he has a given quality of metal, at just what speed he must run his parting tool or his thread tool to do the work with the greatest economy; and we would suggest the following as a practical rule for obtaining the desired cutting speed.

Referring to our practical tables, 89-100, for cutting steel and cast iron, find first the feed, i. e., the thickness of the chip which is to be cut by the parting tool; then look in the practical table for cutting steel or cast iron as the case may be, for our standard ⅞-inch tool under 3-16-inch depth of cut and with the thickness of the feed which corresponds most nearly to the given thickness of the chip which is to be taken by the parting tool; read off the cutting speed from this table, and divide it by 2.7, and this will give the proper cutting speed for the parting tool.

In other words, if we take the practical economical cutting speed of our ⅞-inch standard round-nosed tool when using 3-16-inch depth of cut and a feed which is the same as the thickness of chip to be cut by the parting tool, the speed of our standard tool under these conditions will be 2.7 times as fast as the proper speed for the parting tool.

Practical Rule for Finding Proper Cutting Speed For a Thread Tool When High-Speed Steel of the Quality of Tool No. 1, Table 116, is Used.

If in the same way we first determine the thickness of the chip over the point or extreme nose of the thread tool, i. e., if we determine the exact advance of the thread tool toward the center line of the work each time a cut is taken, and call this advance the thickness of the chip; and if we then proceed as described just above in the case of the parting tool, it will be necessary to divide the speed obtained for our standard round-nosed tool by 4. Or, in other words, if we take the practical economical cutting speed of our ⅞-inch standard round-nosed tool when using a 3-16-inch depth of cut and a feed which is the same as the advance of the thread tool toward the center line of the forging which is made after each cut taken by the thread tool, the speed of our standard tool under these conditions will be four times as great as the speed of the thread tool.

More or less difficulty will be found in applying both of these rules, owing to the fact that in our practical tables we have not given a large enough variety in the fine feeds. If time permitted we should give tables for the proper cutting speeds of thread tools and parting tools.

Cutting Speed of Broad-Nosed Tools With Straight Line Cutting Edge Compared with Standard ⅞-Inch Round-Nosed Tools.

To show the relation in cutting speed existing between our standard ⅞-inch round-nosed tool and a tool having a straight line cutting edge, cutting a shaving exactly one inch long, as shown in Fig. 27: If these two tools are set so as to take a depth of cut exactly 3-16 inch, with a feed of 0.08 inch, then

the cutting speed of our standard round nosed tool = 1.7 × the cutting speed of the straight edged tool

In other words, if we know the cutting speed of our ⅝-inch standard tool, and wish to find the corresponding cutting speed for a straight edge tool having one inch of cutting edge under cut, multiply the cutting speed of our standard tool by 1.4.

We have referred to standard shapes for tools with broad cutting edges which we adopted and practically used for several years with excellent results. These broad nosed tools are shown in Figs. 36, 37 and 38. When taking the same depth of cut and the same feed

the cutting speed of our standard round nosed tool = 1.7 × the cutting speed of the straight edged tool

Or, if we know the cutting speed of our standard ⅞-inch tool, and wish to find the corresponding cutting speed of a broad nosed tool, multiply the cutting speed of the standard tool by 1.3. The relation between the cutting speeds of these types of tools was determined by us years ago with tools made of carbon tempered steel. They

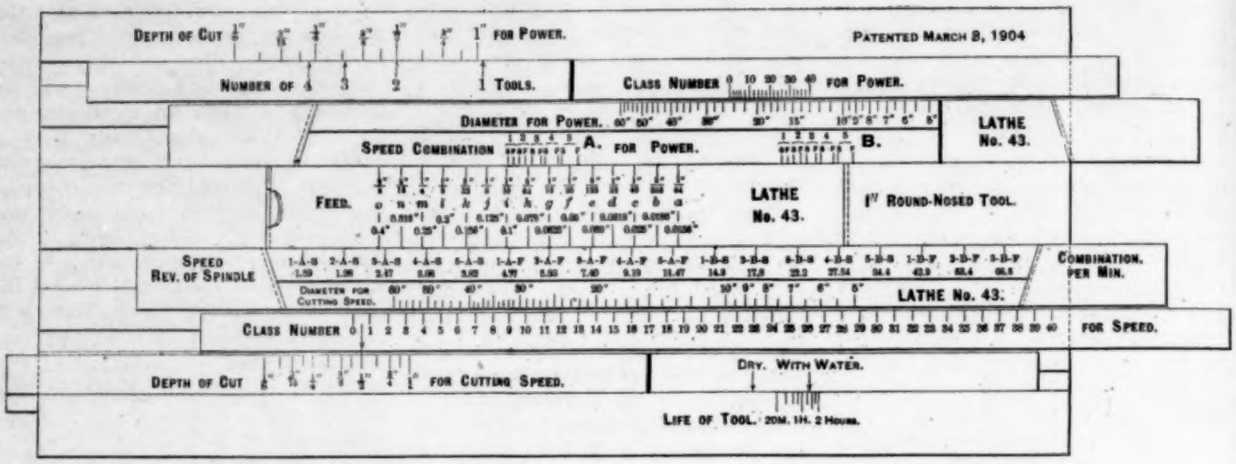


FIG. 128.—LATHE SLIDE RULE EMBODYING THE IMPORTANT LAWS DEDUCED DURING EXPERIMENTS.
The use of this rule should be accompanied by that of the time slide rule shown in Fig. 129.

should again be accurately established through experiments with the best high speed tools.

SLIDE RULES.

Under the head of slide rules we refer to the practical solution of the mathematical problem which includes the laws as to the effect of the twelve variables referred to early in the paper upon the three great questions:

What depth of cut shall be used?

What feed shall be used?

What cutting speed shall be used?

The practical and successful use of these laws as embodied in slide rules has been referred to by us, and we have briefly described some of our efforts at solving this problem and the difficulties which we have met with. It may be of interest, however, to go somewhat more into detail upon this subject with a view to indicating in general the steps taken by us in its solution.

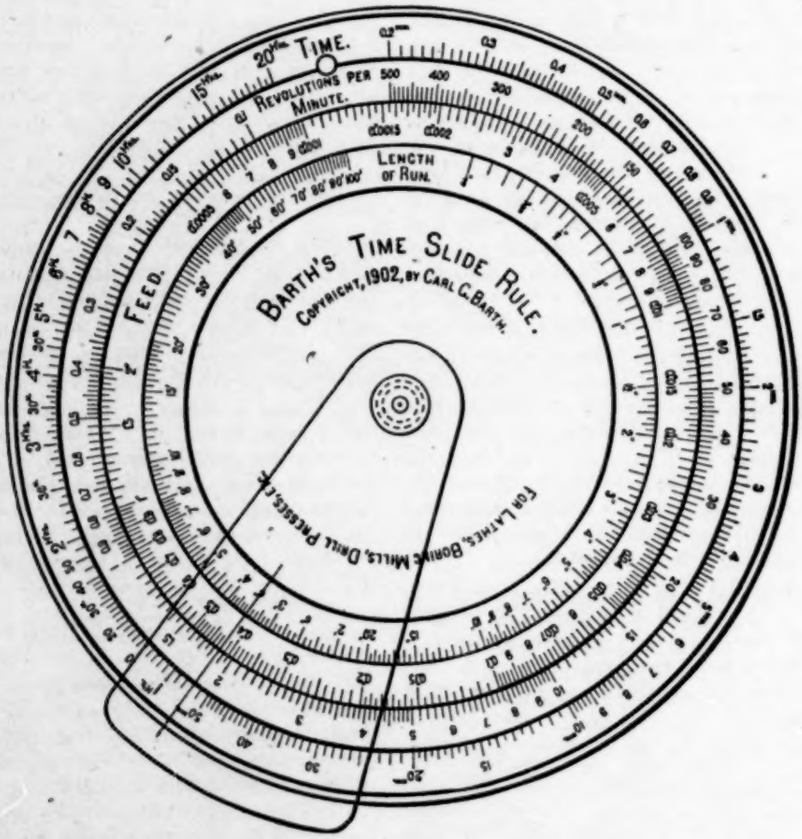


FIG. 129.—TIME SLIDE RULE FOR MACHINE SHOP USE.
This slide rule is to be used in connection with slide rule shown in Fig. 128 and is to determine length of time required to take a given cut from the feed and revolutions per minute obtained with lathe slide rule.

Almost as soon as we had succeeded in developing formulae which represented the results of our experiments, we realized the seriousness and difficulty of the problem before us in endeavoring to make practical and everyday use of these results. The first mathematical solution of the problem was made by G. M. Sinclair, who devoted, as the writer remembers, a year or more of consecutive work to this end with the help and advice of the writer.

This solution was accomplished by means of overlying curves plotted on ordinary cross-section paper, with which we were able to work out laboriously and exceedingly slowly for each particular lathe or planer, a set of tables which could be used for most of the conditions met with in ordinary work. This method was, however, so exceedingly slow and laborious as to make it far from generally useful.

After Mr. Sinclair left the problem, H. L. Gantt devoted a year or more of his time almost exclusively to its solution, and it was during this period that we substituted curves laid out on logarithmic paper for the direct curves laid out on ordinary cross-section paper. As a result of this work, we obtained a logarithmic sheet upon which both diagrams and figures were used to represent the laws, and by means of an elaborate cross slide, upon which further elements of the laws were entered, we were able to make a more rapid and much more direct solution of the problem. This was done, however, by the method of trial and error, but by means of this crude sliding table we were able to make quite rapid approximations to the proper working conditions.

It was not until after we began our experiments at the works of the Bethlehem Steel Co. that we finally gave up the hope of obtaining a mathemati-

cal solution of this problem through the aid of some of the more noted mathematicians. Mr. Gantt and the writer again attacked the mathematical side of the problem at Bethlehem, and substituted an especially made slide rule accompanied by diagrams, by means of which a still more rapid solution of the problem was obtained. When in this state Carl G. Barth joined our work, and together Mr. Barth, Mr. Gantt and the writer developed the final slide rule illustrated in Fig. 128, by means of which the problem is directly and very quickly solved. This slide rule has since been patented jointly by Messrs. Barth, Gantt and the writer. As before stated, however, Mr. Barth is a better mathematician than either Mr. Gantt or the writer, and it is very largely to his long continued work both on the slide rules and in revising the expressions for the laws that the present solution of the problem is due.

Attention is again called to the fact that all the mathematical formulae representing the laws are suited for use on the slide rule. We have been limited to formulae capable of logarithmic expression, and it is indeed fortunate that it has proved possible to represent fairly accurately with this single type of formula all of the laws referred to.

In Fig. 129 is illustrated a circular slide rule made by Mr. Barth, which is used in connection with the lathe slide rule, Fig. 128, for quickly figuring the time required to do the work. Both of these slide rules are described by Mr. Barth in his paper, entitled "Slide Rules for the Machine Shop as a Part of the Taylor System of Management."[1]

The writer has indicated some of the difficulties attending the practical everyday use of these slide rules in machine shops, and has also stated the fact that he has no very great hope of their rapid introduction into practical use. He would add, however, that he looks upon task management as a matter of such great moment, both to the workmen in raising their wages and rendering strikes and labor troubles unnecesary and to the manufacturers in increasing and cheapening their output, that although he has personally retired from the active introduction of this system of management professionally, he is still devoting his time to furthering the introduction of this system, and expects to make this the main object of his remaining life's work. He wishes to state, therefore, that he will be glad at all times to assist through advice any company desiring to work along these lines.

[1]Trans. A. S. M. E., Vol. XXV.

THE TWO-CYCLE COMBUSTION ENGINE.

By James McIntosh.[1]

In the early days when the Otto patents were still in force several engine builders, not feeling as if they cared to pay royalty for using the then patented Otto, or four-cycle, set to work to obtain results by using other cycles, and under this incentive the two-cycle engine was devised. In England the Clerk and Stockport engines were in their day brought to a high state of perfection and the results obtained from them were nearly equal to results from four-cycle engines, and despite the extra cylinder of these engines used as a displacer or pump, together with the added work and weight, there was a large market for them up to the time when the Otto patent expired and became public property. Since that time the two-cycle engine has been more or less discarded in favor of the four-cycle, and every attempt to again bring it into common use has been confronted by that time honored obstacle,—the other fellow does it this way, his stroke and cylinder diameter are so and so, and,—his ports are like this, certainly he ought to know, because he has been in the business long enough to know, and then again,—my engine is good enough for a boat, or a farmer, and it is just as good as the other fellow's,—with the final result of all these foolish arguments that the two-cycle engine has never been properly developed. Another reason for the lack of improvement has been the limited amount of capital invested in any one plant for the manufacture of two-cycle engines. Considering, therefore, that to change the design materially would mean a large outlay of money, and perhaps in prospect would not increase the sales enough to warrant the change, the small manufacturer has in consequence manufactured the engines the same way each ensuing year as the year before, and this performance has been repeated year after year until the manufacturer came into such a rut that he did not care to make any changes on his engine whatever. There is a saving situation, however, for just about this time someone else comes along with a good lot of energy in store and starts to manufacture the two-cycle engine also, then the man in the rut must wake up and get busy, or else quit business altogether, and the chances are even that by this time the energetic rival will be so far in the lead that it is impossible to overtake him and the race for supremacy has been won.

I will now review in brief what will make a success of not only the two-cycle but of any other line of business. First, outline a plan whereby you will be able to make things, not as they have been made, but as they should be made regardless of what others think. If you wish to succeed, take the lead, get your design as you want it, spend lots of time and think it over from every standpoint, exercise a little common sense, and you may find yourself in possession of something that will surprise you. Take the different conditions as they occur to you and reason them out in their respective relations, considering every point as if it were of the greatest importance and getting every detail exactly as you want it. When you are completely satisfied with your design, there is still another problem to be considered, the problem of manufacturing satisfactorily. Is every detail as simple as it might be, taking the pattern shop, foundry and machine shop into consideration? If it is not as simple as possible, has it other advantages that compensate for lack of simplicity? Simple things are not always best when results are lost by their simplicity, although wherever equal results can be obtained the simpler the details the better.

In considering the different types of engines for the purpose of discovering faults, one can invariably find them. Sometimes they are the result of lack of thought in the first design, sometimes because temporary and faulty remedies are permitted to become final and sometimes it is due to the desire to simplify matters regardless of results. Take for example the average pump on a marine two-cycle engine made with standard check valves, nipples, etc., which in the end costs excessively and has few advantages, to say nothing of the disadvantages of extra expense, leaky joints and increased friction, which it possesses in addition to the tendency to clog up, due to so many sharp corners. In comparison with such a pump, a self-contained type may appear to be complicated, but it is cheaper in the first place and more satisfactory in the end.

A clearer idea of the advantages of a self-contained pump, or a plunger pump over a gear pump may be obtained from the following. Suppose a boat runs into a sand or mud bank and the engine is reversed to pull her off, will it be advisable to run without water until it is pulled off, a necessary measure if the engine is equipped with a gear pump, because it will only work when running ahead, or would it be better to have a plunger pump, which could keep the water in circulation all the time. A pump of this type is not affected by the direction the engine runs when driving from a crank or an eccentric.

Another point which so many manu-

[1]Superintendent of the Ferro Machine & Foundry Co., Cleveland.

facturers consider is the casting of the cylinder head separate, so that the cylinder can be bored on an engine lathe. While this is one poinf in its favor, all the others are against it. Such a design is a source of trouble from the start, besides adding to the cost of production, increasing the number of parts and also destroying the proper circulation of jacket water. Another common practice of engine builders, where they cast cylinders in pairs, is to pump cold water in on one side of a cylinder and to take it off the far side of the other. This may be the easiest way but not the most satisfactory. In a two-cycle engine, there is always a tendency toward heating around the exhaust port. Near the exhaust port should therefore be a good place to have cold water enter, and for various reasons, natural laws, etc., it should subsequently come out at the top of the cylinder. Care should be exercised to prevent the existence of air pockets, or rather steam pockets, due to the outlet being below the extreme top of the cylinders, so that the spark plugs will get the full benefit of the jacket water. If this condition is permitted, the spark plugs will probably become overheated and may cause pre-ignition, thereby losing power and putting undue strain on the several bearings, with consequent general trouble and shortening of the life of the engine.

In regard to the proper distribution of metal in the cylinder, care should be exercised in the avoidence of surplus metal in corners, especially around the ports, where in a two-cycle engine there is a tendency to overheating and irregular expansion. But if the metal is cut down to an even thickness and cooling is obtained uniformly, there should be no serious trouble from that source. Another point to be considered is having the point where the water jacket connects with the cylinder beyond the portion of the cylinder exposed by the piston during the down stroke, so as to insure the exhaust port being properly cooled all around, and also to prevent the water jacket turning in abruptly on the cylinder barrel. For, if the cylinder be large, this will have a tendency to form a rib, and thus prevent the cylinder from expanding at that point. This can be eliminated by turning the jacket in at an angle of, say 30 degrees, or by using a large radius. The logical water jacket should, however, be tapered with regard to the heat generated, so that the head end, being always exposed to the highest temperatures, should be the largest and so that the body of water should be sufficient to properly conduct the heat generated at all points of the stroke, to a point where suitable conditions for lubrication can be obtained.

The matter of lubrication is an important one, and the question is at once raised, what is the proper thing to use, grease or oil? The only argument in favor of the former is this, that you can increase your crank case compression by using the former after your bearings are worn and leak, but on the other hand, it is the grease itself that has caused this leakage, for, when a good oiling system is installed, the wear on the bearings after a season's work is hardly noticeable. It is just as essential to the life of an engine to have a constant and regular supply of oil, as it is for the body to have a constant supply of blood coursing through the arteries and veins. The minute this supply is cut off in a human being it means death, and it amounts practically to the same thing in an engine when the supply of oil is shut off. This is really what you are doing when you try to install a grease cup system in preference to an oiling system. The grease generally comes when it is of no more use, that is, after the engine has been ruined, because someone forgot to turn a grease cup down.

In a correct oiling system, the above condition of affairs is impossible; the flow of oil is just as regular to all parts of the engine as breathing is to a human being. The propeller shafting on an ocean liner is usually lubricated with grease, but the entire engine, crank shaft included, uses oil, and all the heavy stresses are usually found on the engine. It is not policy to depend on some one to turn down grease cups at stated intervals, which may, or may not be often enough, particularly when a system of lubrication that is regular in action can be as easily installed and when adjusted give good results.

A gravity oil feed is an improvement over grease cups, but has to be attended to on starting up and shutting down and with age presents a liability to clogging up of the feed pipes. This clogging is not so liable to occur with a pressure system of oiling, where the oil is under pressure which varies from 3 to 5 pounds, while the engine is running, to nothing when the engine is shut down. That is, the faster the engine runs the more the pressure tank is filled with additional air pressure from the crank case, and the slower the engine runs the less the pressure is in the crank case and the less oil is fed to the bearings as a result, making a system as nearly automatic as need be to insure proper lubrication with the least attention from the operator. Such a condition any pleasure-boat owner will appreciate, because he can entertain his friends and enjoy their company without having to go aft and screw down the grease cups.

As a machine, the two-cycle engine has been looked upon as crude in design and unworthy of serious consideration, but when care is taken to develop its full possibilities, by careful designing and consideration of requirements results may be obtained that will surprise the most skeptical critic. The two-cycle engine has its good points and lots of them. First—it possesses simplicity, and that in no small degree when comparison is made with the four-cycle engine whose inlet and exhaust valves operated either mechanically or with automatic inlet present opportunities for getting out of adjustment and the loss of compression due to leaky valves, especially with multiple engines. The item of extra weight, due to double the number of cylinders, pistons, connecting rods is an important consideration, to say nothing of bearings to be cared for and kept in repair, which work can hardly be entrusted to a novice. The wiring is also double, as are the number of spark coils. The crank shaft is more expensive and more care is required to keep the entire engine in shape. The two-cycle has just half the bearings to look after and to lubricate. In the three-port type, there are no valves to leak and get out of adjustment and the loss due to compression can only be due to piston rings wearing and they can be replaced at half the cost of the other engine with double the number of pistons. Another point is, that a two-cycle engine can be run in either direction and can be reversed with as much ease as a steam engine with a link motion. This is quite a feature alone, and should not be overlooked, though, to be sure, care is to be taken in so doing, for it is not policy to reverse any engine when running at high speed, the same holding equally true with a steam engine.

As to economy, the four-cycle has the best of the two-cycle, when the gasoline bill is paid, but that is not all. Consider that you have to carry twice the weight, due to the fact that your engine works only half the time that a two-cycle does, and that double care is necessary to keep a four-cycle in shape. The economy you have on one hand is lost on the other. Remembering the first cost of your engine and the interest on the money invested, together with the price of a reverse gear on a reversible propeller, it will be a long time before the average buyer notices the much-talked-of gain in economy. I am inclined to predict, therefore, that the time is not far distant when following the advent of the six-cylinder, four-cycle automobile engine and its added complications over the four-cylinder, manufacturers will resort to the two-cycle engine as the simplest agent giving the most regular turning effort.

Securities Display Narrow Movement.

A sluggish and irregular movement in securities generally was the predominating feature of stock trading in the week under review. Opening with a fair degree of activity at the beginning of the week, the buying and selling gradually diminished until Thursday when sales were the smallest of any day of the year thus far, and the day was one of the dullest for years on the New York stock exchange. Whatever trading was present on the exchange was entirely of a professional order, the outside public exhibiting a tendency to carefully avoid speculation under present conditions. The price movement was contracted and gains and declines were accordingly small. The present stagnation of the market was not entirely unexpected, following the heavy decline and subsequent recovery of prices, and the situation has resolved itself into a question of interpretation on the part of purely technical traders as to whether the real low point of the market has been reached and passed, or is yet to come. It appears to be a clear conclusion that the liquidation in the stock market has passed, and that thereby the menace of a condition of inflated speculation has been removed and the state of the money market has been improved. Attention continues to be riveted upon the crop situation. A much more cheerful view of the probable production is generally being taken as opposed to the unfavorable outlook which had previously been reported. Except in certain sections it is now believed that the average grain return will be made by the fertile fields and valleys of the country. The New York money market continues to feel the favorable effects of the deposit of customs receipts by Secretary Cortelyou, and the general financial situation remains good. The New York bank statement, however, was not a good one. A heavy increase in loans of $25,347,800 was shown, so that while the revenue increased $2,477,300, the gain in deposits and required reserve was so large as to show a decline of $4,148,100 in surplus. According to the statement the loans of the clearing banks in New York exceeded their net deposits by $16,841,400. In the corresponding week of 1906 loans exceeded their net deposits by $9,964,700. This is the situation after four months of the most drastic stock liquidation ever seen in Wall street in a corresponding length of time. Call loans averaged 2½ per cent, while time loans stood at 3½ per cent. The total exchange on the New York market during the week amounted to 3,218,400 shares, as against 5,126,858 shares last week and 6,055,800 shares the corresponding week of 1906. United States Steel stocks were in good demand, 299,700 shares common and 51,600 shares preferred changing hands.

Financial Notes.

The gross earnings of all railroads in the United States reported for April up to date, are $9,680,452, an increase of 13.6 per cent over the corresponding period of last year, indicating a continuing large tonnage movement in nearly all classes of freight.

The International Harvester Co. has completed its full report for the year ended Dec. 31, 1906, but its issuance to the public has been deferred until the management is ready to apply to the New York stock exchange in behalf of listing the company's new preferred and common stocks.

Recent dividend declarations include the following: Warwick Iron & Steel Co., semi-annual dividend of 3 per cent, payable May 15, an increase of 2 per cent per annum; Pennsylvania Steel Co., regular semi-annual dividend of 3½ per cent on the preferred stock, payable May 1; Pullman Co., regular quarterly dividend of $2 a share, payable May 15.

The Republic Iron & Steel Co. is expected to complete payment of its accummulated back dividends on its preferred stock in July, when the final installment of 2 per cent of the arrears will be given to the stockholders. The preliminary statement of the company for the nine months ended March 31, shows a surplus available for dividends up to that time of $1,816,791. The surplus for dividends for the current quarter is expected to be considerably larger than that of a year ago. The regular yearly dividends of 7 per cent and dividends in arrears of 8 per cent will require $3,062,535.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Apr. 20	Changes In Week	Date 1907 Ann. Meet.	Stock Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	11¼	−1⅛	Sept.	19,820,000			
Allis-Chalmers pr	29¾	−3⅛		16,150,000	7 cum		Feb., 1904
American Can	6¼	− ⅜	Feb.	41,233,300			
Am. Can pr	57⅝	+ ⅜		41,233,300	7 cum	5 Q.	Apr., 1907
Am. Car and Fdy	36½	− ⅛	June 27	30,000,000		2 Q.	Apr., 1907
Am. Car and Fdy pr	119	+ ½		30,000,000	7 n. c.	7 Q.	Apr., 1907
American Loc.	63	+ ⅛	Oct. 5	25,000,000		1¾	Feb., 1907
American Loc. pr	105	.....		24,100,000	7 cum	7 Q.	Apr. 1907
American Ship.	73	−1	Oct. 2	7,600,000	6	1 Q.	Mar. 1907
American Ship. pr	105	.....		7,900,000	7 n. c.	1¾ Q.	Jan. 1907
Am. Steel Foundries	83¼	− ⅛	Oct. 1	15,810,000			
Am. Steel Foundries pr.	99	.....		17,240,000	6 cum		Aug., 1904
Barney & Smith	72	.....	June 4	2,000,000	4	4	May, 1907
Barney & Smith pr	140	.....		2,500,000	8 cum	8 Q.	Mar., 1907
Bethlehem Steel	42	− ⅛	April 2	14,862,000			
Bethlehem Steel pr	49	.....		14,908,000	7 n. c.	5 Q.	Feb., 1907
Cambria Steel	37	+ ⅜	Mar. 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	47	.....		8,468,000*	4	4 S. A.	Apr., 1907
Chicago Pneumatic Tool	41½	.....	Feb. 18	6,145,800	4	4 Q.	Apr., 1907
Colorado Fuel	35	+ ⅛	Oct. 21	30,132,000		.....	Apr., 1902
Crucible Steel	9⅛	+ ⅛	Oct. 16	24,578,400			
Crucible Steel pr	72	+ ⅜		24,436,500	7 cum	6	Mar., 1907
Empire Steel	9	+ ⅛	Feb. 27	2,281,400			
Empire Steel pr	50	+1		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	.....	Feb. 19	1,000,000	6	7 Q.	Feb., 1907
Fay & Egan pr	128½	.....		1,000,000	7 cum	7 Q.	Feb., 1907
General Electric	147	− ½	May 14	65,643,600	8	8 Q.	Apr., 1907
Harbison-Walker	10	−1	Jan. 21	18,000,000	6	.....	
Harbison-Walker pr	74	.....		9,600,000	6 cum	6 Q.	Jan., 1907
International Pump	28¾	+2	June 4	17,762,500	2		Apr., 1905
International Pump pr.	79	− ¾		11,850,000	6 cum	6 Q.	Feb., 1907
Lackawanna Steel	50	.....	Mar. 13	34,971,400		.....	.....
Lake Sup. Corp	8	.....	Oct. 2	40,000,000			
New York Air Brake	116¾	+2¾	June 18	10,000,000	8	8 Q.	Apr., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6 Q.	Mar. 1907
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	6 Q.	Feb., 1907
Otis Elevator Co.	36	−2	March 18	6,350,300		3 A.	Apr., 1907
Otis Elevator Co. pr	91	−1		6,308,500	6 n. c.	6 Q.	Apr., 1907
Penn. Steel	65	.....	May 13	10,750,000		.....	.....
Penn. Steel pr	101½	+1⅛		16,500,000	7 n. c.	7 S. A.	Apr., 1906
Pittsburg Coal Co.	12¾	+ ⅝	Feb. 11	32,000,000		.....	Nov .....
Pittsburg Coal pr	55	.....		32,000,000	7	.....	Apr., 1905
Pressed Stl Car	36	+1	Feb. 20	12,500,000	3		Aug., 1904
Pressed Stl. Car pr	93¾	− ¾		12,500,000	7 n. c.	7 Q.	Feb. 1907
Pullman	168	− ¼	Oct. 17	100,000,000	8	8 Q.	Feb., 1907
Railway Stl. Spring	43⅞	−1⅛	Mar. 7	13,500,000		4 S. A.	Mar., 1907
Railway Stl Spring pr.	93¼	.....		13,500,000	7 cum	7 Q.	Mar. 1907
Rep Iron & Steel	28¾	+ ¼	Oct. 9	27,191,000		.....	.....
Rep. Iron & Steel pr	85	− ⅜		20,416,900	7 cum	7 Q.	Apr., 1907
Sloss-Sheffield	53	+ ⅛	Mar. 5	10,000,000	5	5 Q.	Oct., 1906
Sloss-Sheffield pr	100	.....		6,700,000	7 n. c.	7 Q.	Apr., 1907
Tenn. Coal & Iron	145¼	+ ⅝	May 7	22,553,060	4	4 Q.	Feb., 1907
U. S. Pipe & Fdy	36	+1	June 20	12,500,000	4	4 Q.	Dec., 1906
U. S. Pipe & Fdy. pr	80½	−1½		12,500,000	7 n. c.	7 Q.	Dec., 1906
U. S. Steel	37⅜	+ ⅜	April 15	508,302,500	2 n. c.	½ Q.	Mar., 1907
U. S. Steel pr	100¼	+ ⅞		330,281,100	7 cum	7 Q.	Feb., 1907
U. S. Steel 5's	99	+ ¼		463,798,000	5	5 A.	....
Va. Iron, Coal & Coke	73	+3	Sept. 17	8,641,600			
Westinghouse Elec.	146	−1	July 24	24,998,700*	10	10 Q.	Apr. 1907
West'ghouse Air Brake	150	+2	Oct. 1	11,000,000*		2½ Q.	Jan. 1907

Par value of shares, $100, except those starred, $50.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

A charter has been granted the Cline Safe & Lock Co., Richmond, Va., incorporated by J. H. Cline and R. A. Burton.

The Memphis Iron & Metal Co., Memphis, Tenn., has been incorporated with a capital of $18,000 by Joseph Shetzer, Abe Loberg, Lee Goodman and others.

The Universal Machine Co., Albion, Mich., has been organized with a capitalization of $100,000 by Arthur G. Baker, Harvey A. Hadden and Hial Mapes.

The New Jersey Stove Lid Co., registered office, Edgewater, N. J., has been incorporated by Elbert L. Barney, Fred Knowlton and Edgar A. Monfort.

With a capitalization of $100,000, the Elmwood Castings Co., Cincinnati, has been organized by W. F. Dunker, W. W. Birch, R. B. Luebbe and H. Stoffels.

A charter has been granted the Norristown Iron & Steel Co., Norristown, Pa., with a capital of $20,000. William L. Gotwals is treasurer of the company.

The Northern Boiler & Structural Iron Works, Appleton, Wis., has been incorporated with a capital of $30,000 by William H. Timm, A. C. Heinzen and T. J. Schott.

Frank C. Dambach, James R. Hughes, H. W. Dambach, Henry J. Hendricks and W. J. McKean have incorporated the Ellwood Malleable Co., Ellwood City, Pa., with a capital of $250,000.

J. A. Campbell, C. C. Calkins, Buffalo, and E. F. Greene, Silver Creek, have incorporated the Greene Railroad Safety Device Co., Buffalo, N. Y., with a capital of $500,000.

The Vaughn Engine Co., Osborn, O., has been chartered with an authorized capital of $3,500 by Francis L. Vaughn, Joel Kirkwood, C. C. Jackson, John H. Barkman and David W. Fortney.

The Valley Grey Iron Foundry Co., Saginaw, Mich., has been incorporated with a capital of $20,000 by Alexander G. Finley, P. J. Redmond, W. P. Powell and John Lentjohn.

The Hoffman Steam Washing Machine Co., Cincinnati, has been incorporated with a capital of $10,000 by John Hoffman, Gustav Mosler, John Hoffman Jr., C. A. Buckley and Charles Hauck.

The East Iron & Machine Co., Lima, O., has been organized with a capitalization of $125,000 by J. L. Simpson, A. W. Starr, A. D. Newman, B. H. Simpson, W. S. East and W. L. Rogers.

The Metal Goods Mfg. Co.., Painesville, O., has been incorporated by Max E. Meisel, R. Hitchcock, E. C. Mullen, D. E. Morgan and Fred F. Truhlar, to manufacture metal bindings and hardware specialties.

The American Tannery Engineering Co., Lynn, Mass., has been organized with a capitalization of $100,000 by Robert W. Churchill, Peabody, Mass.; John M. Feeney, Uxbridge, Mass., and John F. Gallagher, Lynn, Mass.

The Lamino Metal Co., Cleveland, O., has been incorporated with a capital of $20,000 to manufacture laminated metal as a substitute for tin, by George A. Gaston, Robert J. Good, M. L. Thomsen, V. E. Davis and R. M. Dorrance.

The Lake Ontario Iron Ore Co., Rochester, N. Y., has been organized with a capitalization of $375,000 by George W. Clark, Frank E. Fitch, Jay W. Fowler, William L. Hoyt and Walter S. Strowger, all of the above address.

The Perlman Iron Works, New York, has been organized to manufacture iron and metal work, with a capital of $4,000, by Abraham Perlman, 83 West 115th street; William Bogen, 841 East 141st street, and Samuel Bogen, 3216 Third avenue, all of New York.

Charles M. Seibert, J. Leete Welch, Louis A. Siebert, E. L. Pease and L. F. Slater have incorporated the Siebert-Welch Co., Columbus, O., with a capital of $100,000. The company will manufacture all kinds of vacuum machinery and expects to erect a large plant for this purpose.

The Foundry Equipment Co., Worcester, Mass., has been organized to manufacture furnishing and equipment for foundries. The capital stock of the company is $20,000, and the officers are: Edwin E. Waite, president; William B. Scofield, treasurer; George Crompton, clerk; Edward D. Thayer and Randolph Crompton, directors.

The C. A. Dreisbach Foundry Co., New Haven, Conn., has been organized and will manufacture steel foundry and machine products. The capital stock of the company is $50,000, and the officers are: Charles A. Dreisbach, president; Frederick Chatfield, vice president; Noble P. Bishop, treasurer and secretary, all of the above address.

The Intermountain Safe & Lock Co., with headquarters in Salt Lake City, Utah, has been formed to take over the business of Charles G. Field, as exclusive selling agent of the Herring-Hall-Marvin Safe Co., Hamilton, O. The capital stock of the company is $10,000, and the incorporators are: Charles G. Field, B. F. Redman, Herbert Pembroke, D. F. Parker and George Y. Wallace Jr.

New Construction:—

The Hydraulic Pressed Steel Co., Cleveland, is erecting a new brick factory building, 40 x 120 feet, in that city.

The Roller Plate Metal Co., Stamford, Conn., has contracted for a brick factory building, two stories, 35 x 120 feet.

The Curtis & Co. Mfg. Co., St. Louis, Mo., has the new steel foundry which it is erecting in that city about ready for operation.

The contract for a brick cartridge factory, four stories, 50 x 162 feet, has been awarded by the Winchester Repeating Arms Co., New Haven, Conn.

The Ravenna Furnace & Heating Co., Ravenna, O., has purchased a site of two acres and is planning the erection of a foundry building, 80 x 100 feet.

The Wire Goods Co., 28 Union street, Worcester, Mass., has awarded the contract for the construction of a brick factory addition, four stories, 30 x 50 feet.

The Albert Russell & Son Co., Newburyport, Mass., has completed plans for a new foundry, 80 x 125 feet, which will replace the present structure. Modern equipment will be installed.

The Morgan Construction Co., 21 Lincoln street, Worcester, Mass., manufacturer of wire machinery, has let the contract for a brick and iron blacksmith shop, one story, 50 x 150 feet.

The Hutchins Car Roofing Co., Detroit, is building a new plant at Hyde Park, Pittsburg, which will afford increased facilities of about 50 per cent. George W. Graves, of Detroit, is architect and engineer.

The Fedders Mfg. Co., Buffalo, maker of automobile radiators and sheet metal specialties, has purchased a site in that city and is planning to erect a large brick factory building which it will occupy when completed.

The Charlotte Pipe & Foundry Co., Charlotte, N. C., is constructing a new plant near that city. The main building will be quite extensive. In addition there will be a brick-making shop,

pattern shop, store, warehouses, sand houses, etc.

The Carnegie Steel Co. has filed plans with the building department in the city of Newark, N. J., for three big warehouses which it will erect in that city. The buildings will cover about 16,000 square feet and will consist of a power house, general warehouse and bar warehouse.

The Hildreth Mfg. Co., Lansing, Mich., has completed its new foundry and now has it in operation. Further extensions are contemplated, including an addition which will afford 8,000 square feet of additional floor space. The company is making a specialty of gas engine castings.

The William Kavanaugh Co., Norwalk, O., has just completed a new foundry building, 60 x 160 feet, which will greatly increase its capacity. The new foundry will make castings for the gas engines which the company manufactures and also castings for its regular oil country trade. S. G. Lockwood is president of the company.

The Winkley Co., Detroit, manufacturer of carburetors and lubricating devices, is about to begin the construction of a new plant, 50 x 130 feet, two stories. The improvement will more than triple the capacity of its present plant. The kind of power has not yet been determined. George W. Graves, of Detroit, is supervising architect and engineer.

The Southwestern Iron Co., Guthrie, Okla., states that it is just beginning work on an addition to its foundry in the form of a brick molding room, 60 x 80 feet, which when completed will give it a molding room, 60 x 160 feet. The company will install another cupola with a capacity of 18 to 20 tons, which will give it an output of 25 tons. It is expected that the improvements will be completed and in full operation within 60 days.

The New Departure Mfg. Co., Bristol, Conn., is planning the erection of a four-story brick building with basement in which it will carry on the manufacture of bearings and also steel balls for various purposes. Later it expects to erect a forging plant. The officers of the company are: A. F. Rockwell, president; George A. Graham, vice president; De Witt Page, secretary, and Charles T. Treadway, treasurer.

The Tennessee Kaolin, Iron & Timber Co., Paducah, Ky., reports that it is making arrangements to build a furnace to manufacture charcoal iron. The capital stock of $200,000 has all been subscribed, and the company is manufacturing lumber and railroad ties, and is engaging in the shipping of kaolin and iron ore. The property owned by the company comprises 20,000 acres of land. The officers are: J. B. Bartee, president; E. R. Street, vice president; George F. McCandless, secretary, and W. F. Sills, treasurer. Mr. Sills is also general manager with headquarters at Model, Tenn. The general offices of the company are at 108 Fraternity building, Paducah, Ky.

General Industrial Notes:—

The new 10-inch skelp mill of the Youngstown Sheet & Tube Co., Youngstown, O., has been placed in operation.

The De Graff Steel Post Co., De Graff, O., recently organized, will manufacture angle steel and iron fence posts used by railroad companies as protection from fire.

The St. Paul Foundry Co., St. Paul, states that the portions of its plant which were damaged by fire recently have been rebuilt and are now in operation. All the necessary equipment has been installed.

The Standard Car Wheel Co., Cleveland, has increased its capital stock from $75,000 to $150,000. The additional capital will be used in increasing the output of the concern to accommodate its growing business. No building is contemplated at this time.

The E. G. Whitacre Boiler Co., Wellsville, O., recently incorporated, reports that it does not contemplate any improvements. W. C. Dallmeyer, of Pittsburg, and W. H. Kelley, of Wellsville, with two others, have been admitted to the corporation and form the directors.

The Griffith Mfg. Co., Beloit, Wis., manufacturer of foundry equipment, has been organized by the election of the following: President, S. Griffith; vice president, W. S. Perrigo; secretary, F. S. Foster; treasurer, D. H. Foster. Directors: F. S. Foster, P. H. Crahen, W. S. Perrigo, S. Griffith and D. H. Foster.

The W. T. Adams Machine Co., Corinth, Miss., has rebuilt its plant which was destroyed by fire some time ago, on a larger scale. The machine shop and foundry are both supplied with overhead cranes. The capacity of the plant is about 50 per cent over that of the old one, and orders now on hand will keep it running six months.

The plant of the Pocahontas Iron Works, Norfolk, Va., has been completed and put in operation. The concern will manufacture all kinds of castings and structural work. The officers are: M. A. Roach, president and secretary; Dr. J. P. Jackson, vice president; and A. J. Truitt, treasurer. L. E. Miller is superintendent of the foundry.

The Atlas Drop Forge Co., Lansing, Mich., is rapidly completing the installing of its equipment, and will be in full operation by May 1. The machine shop is now operating. The company will make a specialty of forge parts for automobile, gas and marine engines. Particular attention will be given to the making of large, single and multiple throw cranks.

Jenkins Bros., manufacturers of the Jenkins' standard '96 packing, Jenkins Bros.' valves and other steam specialties, recently incorporated at Elizabeth, N. J., state that the concern will continue the business previously carried on by the firm of Jenkins Bros. The company does not contemplate the erection of any buildings at the present time.

The J. D. Smith Foundry Supply Co., Cleveland, has closed a deal for the purchase of the old Variety Iron Works, No. 1 plant, adjoining its present property, and will equip it for a machine shop. The building will give 45,000 square feet of additional floor space. The company has recently taken the United States selling agency for the Fisher side-blow steel converter.

The Joliet Iron Products Co., Joliet, Ill., has been organized by the election of the following officers: President, J. J. Gaskill; vice president, Gus Ancot, Aurora; secretary and general manager, C. E. Woodruff; auditor, James A. Hoover, Pontiac; general superintendent, D. H. Lentz. The directors are D. H. Lentz, Geo. F. Gurney, Adam Groth, J. J. Gaskill, Gus Ancot, Dallas F. Green, Ft. Wayne, Ind.; Gus Ancot Jr., Aurora; C. E. Woodruff, James A. Hoover, B. B. Forquear, and L. N. Hutchinson.

At the annual meeting of the stockholders of the Passaic Steel Co., held at Paterson, N. J., recently, F. C. Reinhardt was re-elected president, John R. Lee was made vice president, and J. B. Cooke, secretary and treasurer. The following directors were chosen: W. A. Arnold, T. H. Conderman, O. W. Cooke, J. B. Cooke, John F. Dolan, Herman Osthaus, Franz C. Reinhardt, Charles Simon, James Simpson, Joseph Wadsworth and A. T. Wright.

At a meeting of directors of the Allis-Chalmers Co. the executive committee was made a Milwaukee committee. L. F. Bower, heretofore comptroller, and Henry Woodland, treasurer, were promoted to vice presidents, the former in charge of accounts and the latter in charge of the treasury and credits. Charles Allis was elected chairman, the other members of the committee being President W. H.

Whiteside, L. F. Bower and Henry Woodland.

Of interest to users of crucible steel castings in the Chicago district will be the announcement that the Chicago Steel Foundry Co. has completed its new foundry at Nineteenth and Rockwell streets, in that city. This concern was organized last year to manufacture crucible steel castings exclusively, and it is the only plant of that kind in Chicago. David McLain, for several years in charge of the foundry of the National Electric Co., Milwaukee, has been engaged as superintendent, and David Evans & Co., Rookery building, Chicago, are the selling agents.

The Wyoming Fuel & Iron Co. has been organized at Columbus, Neb., and the following officers elected: President, F. O. Blake, Pittsburg; vice president, Frank T. Walker, Columbus; secretary, Egbert C. Misner, Fremont; treasurer, A. T. Roen, Columbus. Board of directors: F. O. Blake, Pittsburg; C. Christensen, Fremont; Dr. A. E. Littlechild, Fremont; W. H. Clemmons, Fremont; Frank T. Walker, Columbus; Edwin Chambers, Columbus; C. E. Burnham, Norfolk; O. H. Flory, St. Edwards; N. J. Johnson, Ames; Clark S. Packard, Excelsior Springs, Mo., and John C. Cunning, Rawlins, Wyo.

The Empire Foundry Co., New Brunswick, N. J., recently incorporated, reports that it has taken over the business operated under that name for the past five years. The officers are: President, W. C. Whitehead, of New York, president of the Smith & Mabley Mfg. Co., manufacturer of automobile and motor boats; vice president, F. R. App, New York; secretary and treasurer, H. J. Long. The direct management is under the control of Mr. Long who held an identical position with the Monarch Water Heater Co., Pittsburg. The new company, in addition to a general jobbing line of small gray iron castings, will place on the market a complete line of gas appliances. This will include hot plates, cookers, ranges, radiators and heaters.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Co. the old board consisting of Edward F. C. Young, John A. Walker, Edward L. Young, William Murray, George T. Smith, Joseph D. Bedle and George E. Long, was unanimously re-elected. The board of directors re-elected the former officers namely, E. F. C. Young, president; John A. Walker, vice president and treasurer; George E. Long, secretary. Judge Joseph D. Bedle was also re-elected as counsel. The stockholders present expressed themselves as thoroughly satisfied with the management of the company by its officers. Of the total number, 7,345 shares, there were represented 6,460 shares.

Charles S. Price has been elected a director of the Cambria Steel Co. vice J. W. Townsend, resigned. Mr. Price was also elected a vice president. He has been the company's general manager, and will retain that position in addition to that of vice president. Alexander P. Robinson, formerly treasurer and assistant secretary, has been chosen second vice president; Edward T. Stuart, formerly assistant treasurer, has been promoted to treasurer and assistant secretary and Louis K. Kruse has been elected assistant treasurer. The board of directors of the company framed a resolution regretting the resignation of Mr. Townsend, who had been connected with the company for a period of nearly 32 years.

The Williamette Iron & Steel Works, Portland, Ore., announces that it has erected a thoroughly up-to-date foundry, equipped with the latest saving devices in that city. The main floor is traversed by a 20-ton all electric crane, with supplementary jib cranes to avoid delays in handling. The foundry is served by 66 and 54-inch cupolas and has a daily capacity of 30 tons. In addition to the facilities of the foundry itself, the auxiliary equipment for handling pig iron, scrap and finished castings is of the best, with ample yard room, equipped with industrial railway, to reduce operating expenses to the lowest possible basis. A special feature has been made of the systematic storage of its large stock of standard patterns. A large part of the output of the foundry will be taken up by the company's own requirements for high grade machinery castings. In addition to regular gray iron castings and special chilled castings, the company offers its patrons a high grade of semi-steel castings.

Trade Notes:—

The Otto Zobler Mfg. Co., Chicago, announces that it has removed to 101-103 North Oakley avenue, where it has built its own plant.

The Crispin Sheet Metal Mfg. Co., Philadelphia, has been forced by increasing business to remove to larger quarters. The new offices and factory are located at 3038-3046 Chestnut street.

Hill, Clarke & Co. will remove their New York office from 123 Liberty street to the new West Street building. They have taken one of the stores on the ground floor and will show a large line of samples.

The Marshall & Huschart Machinery Co. has opened St. Louis warerooms at 908-910 North Second street, where its offices are also now located. A representative line of machine tools is being carried in stock.

The Balkwill Pattern Works, Cleveland, announces that after June 1 it will be located in its new building at 1444 East Forty-ninth street, N E, where it will have more than three times the amount of present floor space. The company will have the use of the ground floor, allowing it to handle patterns of any size.

The assets of the America Co., manufacturer of hardware specialties, located at Momence, Ill., 50 miles south of Chicago, including factory building, site, equipment and all machinery and tools for manufacturing hardware specialties and novelties, are being offered for sale by Walter C. Lindley, trustee in bankruptcy, Danville, Ill.

Joseph T. Ryerson & Son, Chicago, report a big demand recently for their flue welders. The firms which have placed orders for them during the past two weeks are: Illinois Central railroad, Jackson, Tenn.; DeQueen & Eastern railroad, DeQueen, Ark.; Texas & Pacific railroad, Gouldsboro, La.; United Oil Co., Florence, Colo.; Tennessee Coal, Iron & Railroad Co., Ensley, Ala., and the Tyler Tube & Pipe Co.

Fires:—

Fire in the japanning room of the Detroit Stove Works, Detroit, caused damage of several thousand dollars April 15.

The Lorain Pattern & Mfg. Co., Lorain, O., suffered a small loss by fire recently.

The boiler room of the Erie Railroad Co., at Huntington, Ind., was damaged by fire April 4.

The locomotive repair shop, boiler house and construction shop of the Bethlehem Steel Co., South Bethlehem, Pa., suffered a small loss by fire April 4.

Two store houses occupied in part by the Jeremiah Clark Machinery Co., Lowell, Mass., were heavily damaged by fire April 14. The Clark company's loss is about $10,000, almost fully insured.

Thirty-five members of the junior class of mechanical engineering of the University of Michigan recently inspected a number of Pittsburg's industrial plants. The students witnessed the operation of the Westinghouse plants, the Edgar Thomson steel works and the Crescent plant of the Crucible Steel Co. Previous to coming to Pittsburg the students visited a number of plants in Detroit and Niagara Falls.